RAILROAD GAZETTE

FRIDAY, DECEMBER 14.

CONTENTS.

Contributions.

Information Wanted.

EAST INDIA, November, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Can you or any of your numerous readers oblige me with the address of the "Roadmasters' and Mechanical Engineers' Society of America and Belgium?" If such a society is not in existence *now*, can you inform me if it *ever* existed and when?

RAILROADER.

A Daniel Come to Judgment.

AUGUSTA, Ga., Dec. 10, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The exhibit of the Rhode Island Locomotive Works and of the Baldwin Locomotive Works at the Augusta National Exposition, now nearly over, consists in each case of a fine American type passenger locomotive.

The three judges appointed by the Committee of Awards met on Saturday, Dec. 8, to award prizes, and spent most of the morning in examining the engines. Their opinions being *equally* divided and being well disposed to both concerns, they decided to compromise the matter by awarding first prize to each; and this is how it was done: The Rhode Island engine is equipped with a power brake, while the Baldwin engine, built to the order of the Marietta & North Georgia Railway Co., is specified to have the power brake attached when delivered. Calling the Rhode Island engine a *passenger* engine because of its being equipped with a power brake, they awarded it the first prize as such. The Baldwin engine having no brake, they called it a freight engine, and awarded it first prize as such! In this way the matter was gracefully straddled, and, (to use the language of the immortal pall-bearer, who, being asked by an inquisitive fellow, "What complaint?" replied, "No complaint), everybody's satisfied."

F. W.

How an Englishman Sees It.

GAINES, WORCESTER, Nov. 25, 1888.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your leading article of Nov. 16 I note your remark that a New York syndicate has contracted to construct for the Chilian Government about 700 miles of railway, and that the syndicate will doubtless purchase in Europe the rails, bridges and ironwork, but that it is intended to obtain the rolling stock from the U. S. A. Now, if the contractors are desirous of obtaining the rolling stock at lower prices than those in America that also will be supplied from Europe.

There is no witchery in the manufacture of locomotives and cars of American type, and if the specifications are submitted to the competition of Europe unquestionably the orders will go there. The U. S. A., with a heavy protective tariff, may live upon itself, and perhaps advantageously, but is out in the cold in competition with the free trade production of England, and I have always held that the protective tariff of the U. S. A. is the best possible friend to Great Britain by shutting out the enterprise and resources of the United States of America from the markets of the world.

W. A. ADAMS.

[Rails can be laid down in Valparaiso cheaper than they can be bought at Pennsylvania mills. American bridge builders who have taken contracts abroad have found it more profitable to get the iron from England than to export it from their own mills. Such facts as these led us to the conclusion that although the Chilian contract provides that the bridges shall be of American type, probably much of the heavy iron work will be bought in Europe, and that the rails will almost certainly be. Foreign roads have found it cheaper to have "American" locomotives, cars, trucks, etc., built in Germany and England than in the United States, but in these products, as the element of skilled labor enters in greater proportion, our makers are better able to compete than in rails and bridge materials. As to the theory and effects of "protection" in this competition, those are matters the discussion of which we must leave to others. The "educational campaign" is, happily, over.—EDITOR RAILROAD GAZETTE.]

The Van Dorston Coupler and Cushioned Buffer.

This is a coupler of the Master Car-Builders' type and connects with the ordinary link and the Janney couplers. Fig. 1 is a perspective sketch of the coupler, and fig. 2 is a sectional plan of the draw-head, which has on one side a cushioned guard-arm, and on the other is pivoted a movable knuckle

Fig. 1.

piece, forming a jaw and arm, the knuckle arm also being cushioned. The guard arm has a pocket in which is a rectangular india rubber cushion r, with a cross-section

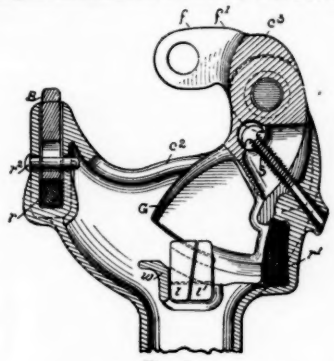

Fig. 2.

of 1 in. × 1¼ in. and 5½ in. long. The buffer B is slotted for the reception of a securing pin r^2. As shown in figs. 1 and 2 the jaw is closed and locked by the tumblers l, l', which fall into place by gravity as the knuckle piece is rotated in the act of closing, the tumbler l first falling, and the second tumbler l' completing the locking operation when the jaw is entirely closed. A second pocket in the draw-bar head contains a rubber cushion r', to relieve the shocks on the knuckle piece or side wall of the head. A compressed spring and carrier-rod S serves to open the jaw when the tumblers l l' are raised. The knuckle arm has a forward guard G, which compels the knuckle to rotate when in the act of coupling with a similar knuckle, the two jaws closing and

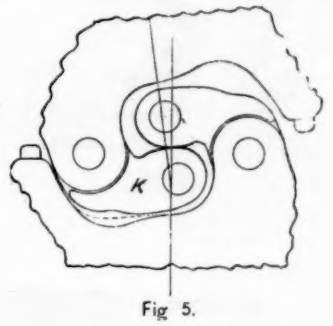

Fig 5.

being secured by the tumblers, without shock, the guard G preventing the jaw from striking C^2, the end of the draw-bar head.

Fig. 3 is a bottom plan view of the coupler and other attachments, and fig. 4 is a front elevation of a part of an end-sill platform car. It will be seen that there is an uncoupling handle on one side connected to a rock shaft, the

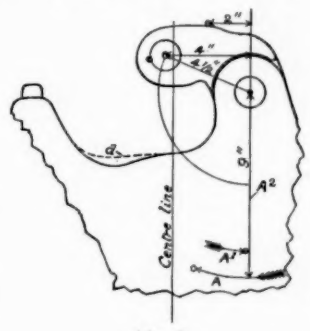

Fig. 6.

other end of which is inserted into a sleeve, the latter being connected with a cam having a lip whereon the lower extremities of the tumblers l l' rest. The bearing for the uncoupling handle is a globe journal, so that the rock shaft can be rotated even if it becomes bent or twisted; and should the coupler be broken loose from its fastenings the rock shaft will be withdrawn from the sleeve.

The cushioned buffers are shown in fig. 3; one dead-block on each car being replaced by one of these devices which serves to diminish the shocks occurring from the contact of two rigid dead-blocks. These buffers are made of cast iron, and are easily applied.

The cushioned draw-timber brackets, recommended for cases where dead-blocks are not used, are also represented in

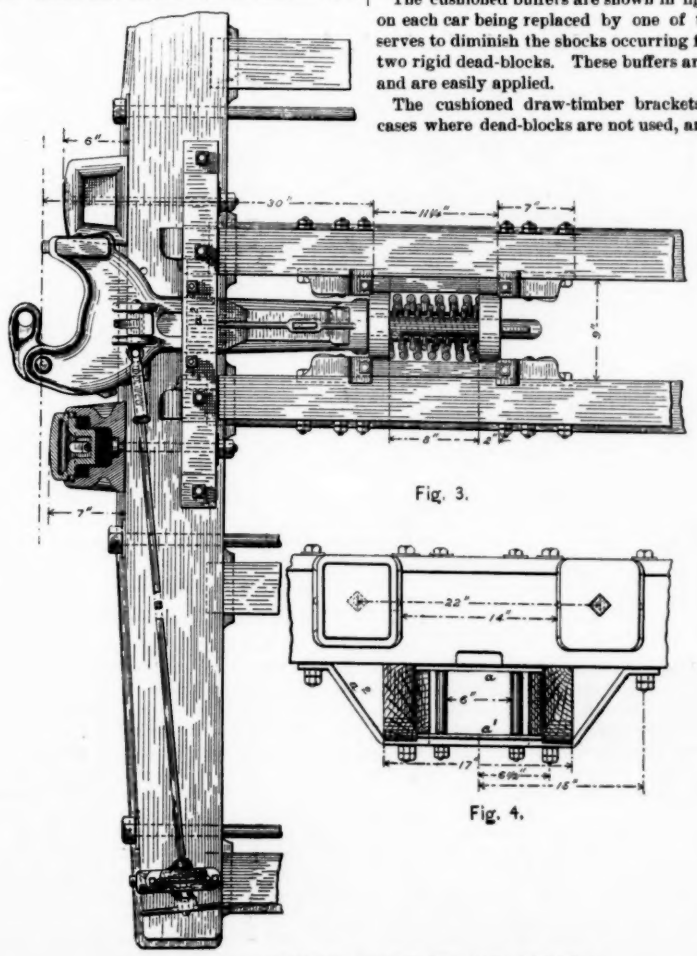

Fig. 3.

Fig. 4.

THE VAN DORSTON COUPLER AND BUFFER.

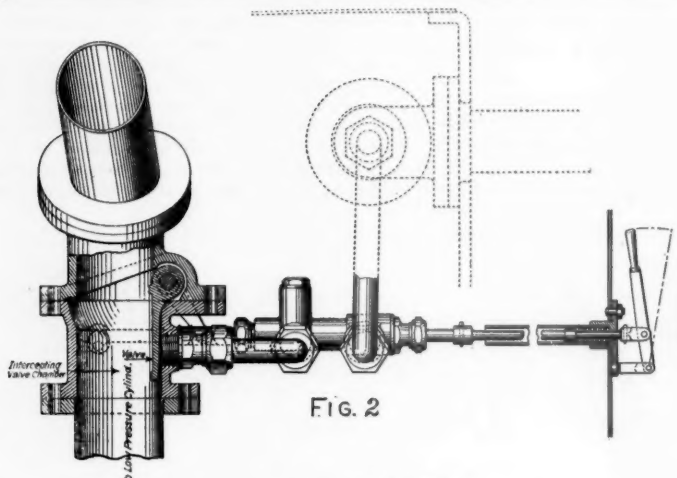

FIG. 2

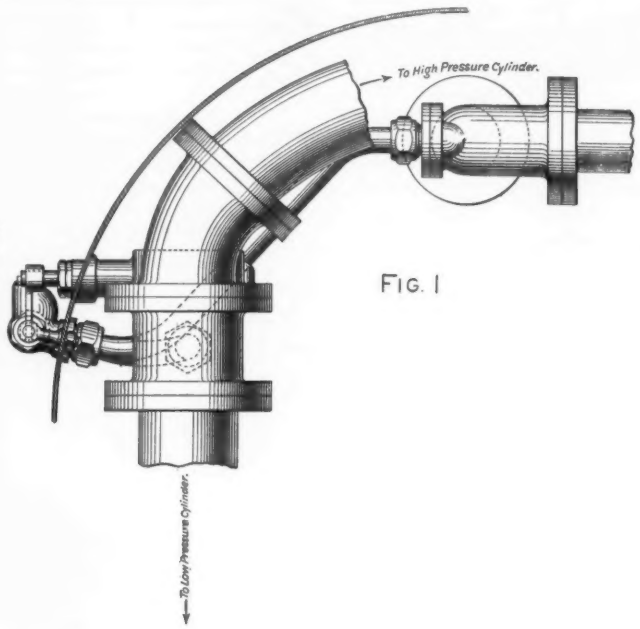

FIG. 1

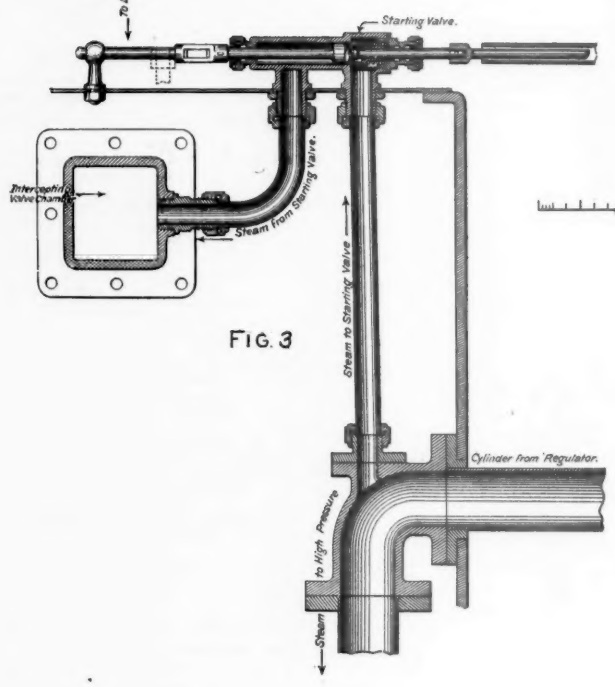

FIG. 3

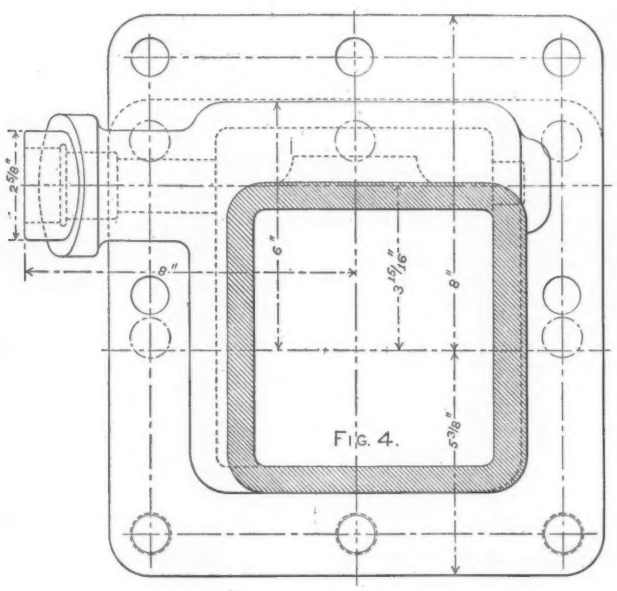

FIG. 4.

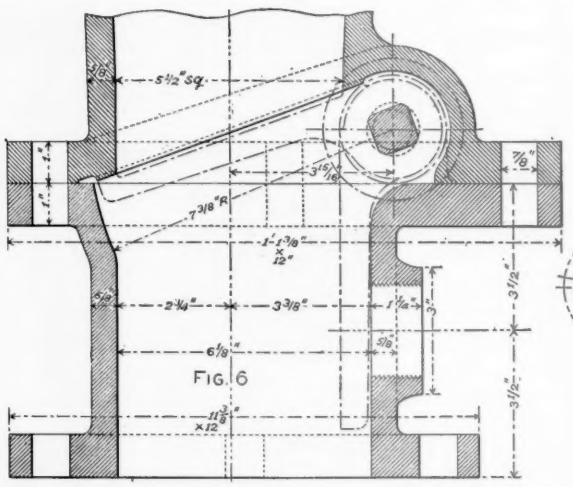

FIG. 6

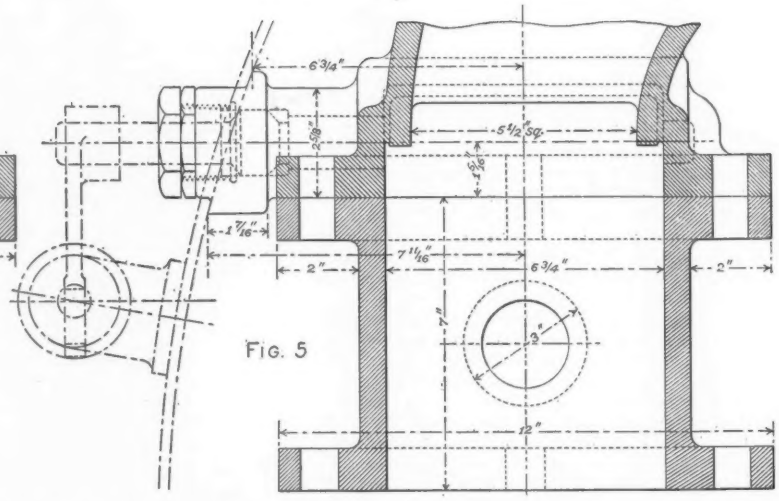

FIG. 5

The Starting and Intercepting Valves.

THE WORSDELL AND VON BORRIES COMPOUND LOCOMOTIVE.

fig. 3. The follower-plates operate against these cushions, which relieve the blows upon the follower-plates and lugs, and serve to protect the draw-spring as well. The carry-iron a^2, figs. 3 and 4, is fitted with upper and lower chafe plates, a and a', shown in fig. 4. These plates can be easily and cheaply replaced when worn out. The distances between the bodies of cars using these couplers are as follows:

	Inches.
Two 9-in. end sill platform cars	34
Two 8-in. " " "	32
One end-sill car and one box car	28
Two box cars	22

By a reference to fig. 2, it will be seen that the contour of the front knuckle face is a compound curve composed of arcs f, f' and c^3, struck from three centres. The object of this special form is to provide for all the contingencies which arise in the use of couplers, such as coupling on curves, contact on curves and straight lines with one jaw open and the other closed, or with both jaws closed; it being intended, in the latter case, to provide a shoulder which may bear against the buffer in the draw-bar head. The curve also permits the use of a guard arm of unusual length. Fig. 5 shows the coupling effected on a curve, the peculiar form of the jaws allowing sufficient clearance for this operation if the inner jaw K should be open and the outer jaw closed when contact occurs. In brief, the inventor says that the curves adopted have been chosen with the idea of preventing wear as much as possible, and where this is inevitable, making it occur uniformly, instead of becoming excessive at particular parts.

When the coupler is locked the lever arm of the traction or perpendicular distance between the centre line of the draw-bar and a parallel line through the centre of rotation of the knuckle) is 4 in., and the lever arm of the resistance to rotation of the knuckle (or projection on the parallel line of the distance between the centre of rotation and the point of application of the locking tumblers) is 9 in., as shown in fig. 6, A being the point of application of the tumblers, and A' the point of application of the knuckle cushion. Some tests of this coupler, made on Sept. 18, 1888, at Columbus, Ohio, for the information of some of the officials of the Pittsburgh, Cincinati & St. Louis. The couplers were attached to two old cars, and were found to couple with the Janney on a straight line, on curves and tangents, at slow and fast speed. Uncoupling was easily effected with cars in motion without diminishing the speed. One car was disconnected and the brakes were set, then the other car and engine were run into it with such violence as to derail the braked car and dismount the other car from the trucks, but the couplers were unin-

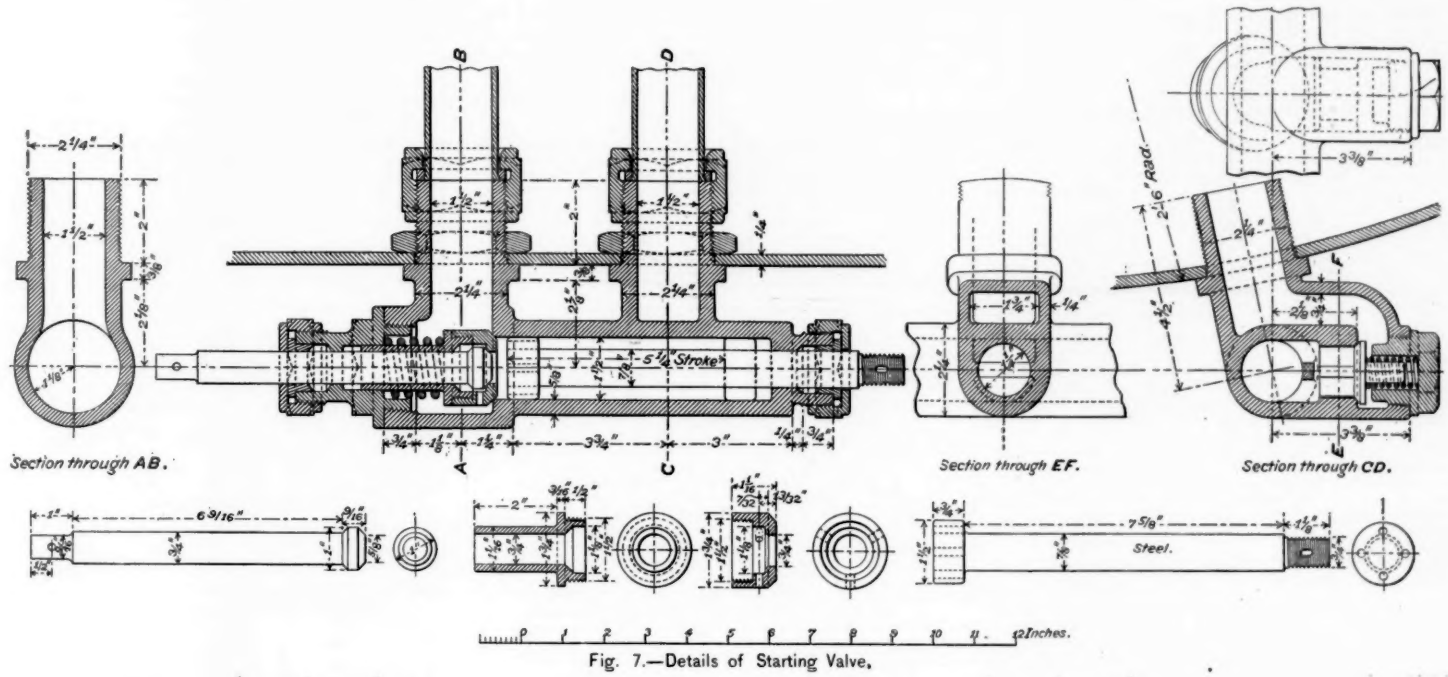

Fig. 7.—Details of Starting Valve.

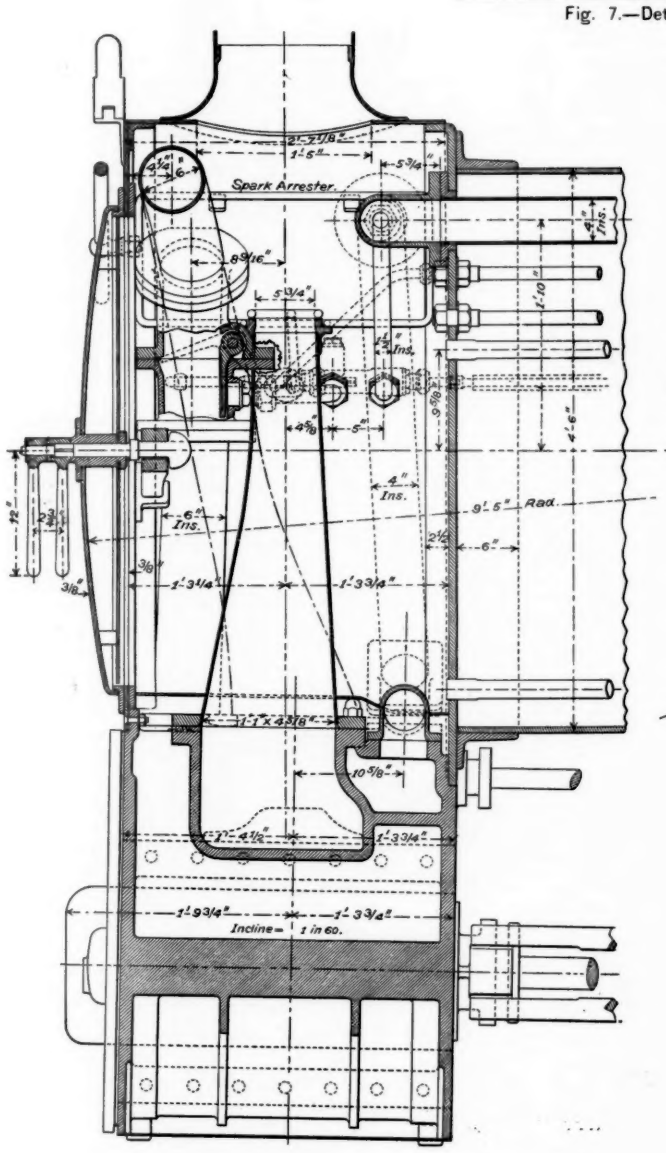

Fig. 8.

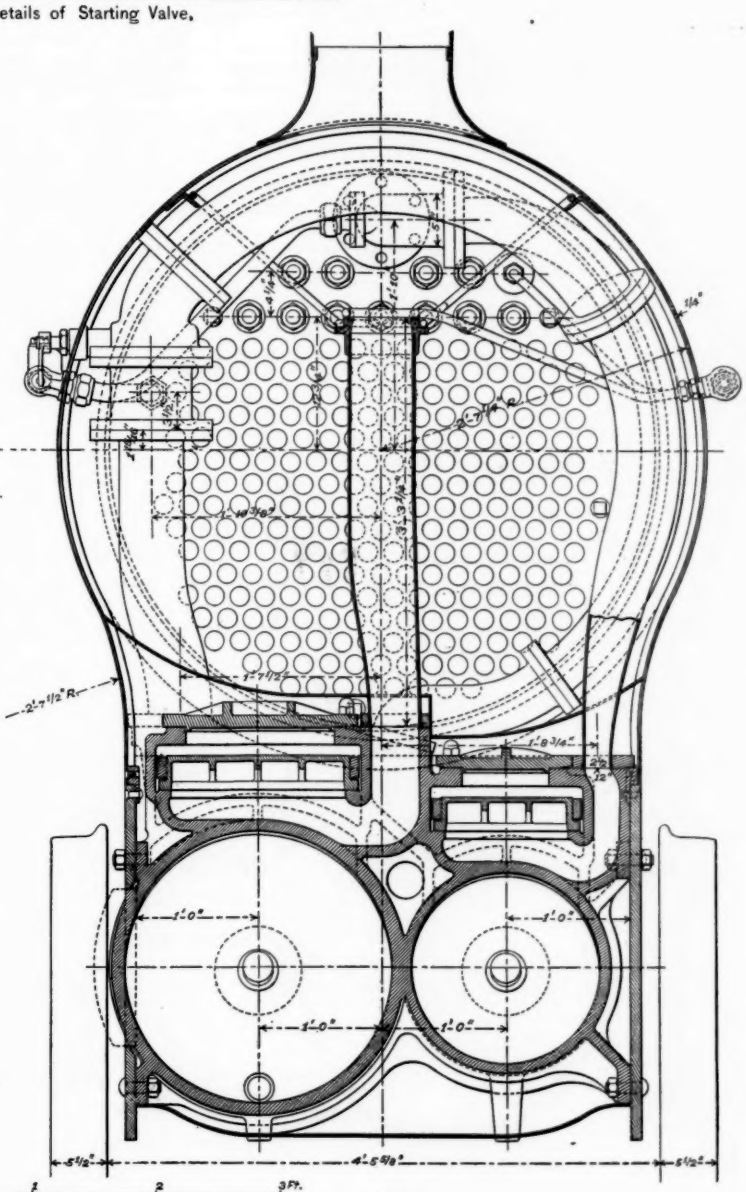

Fig. 9.

THE WORSDELL AND VON BORRIES COMPOUND LOCOMOTIVE.

jured. The uncoupling device was thought by the officers who saw the trials to be very clever and to work satisfactorily.

The Van Dorston coupler is made by the Eureka Steel Casting Co., of Chester, Pa.

The Worsdell Compound Locomotive.

The accompanying illustrations represent the system of compounding locomotives invented by Mr. T. W. Worsdell, Locomotive Superintendent Northeastern Railway (England) and Herr A. Von Borries, Mechanical Engineer of the State Railroads of Hanover (Germany).

Two cylinders only are used in the Worsdell and Von Borries system, the high and low pressure cylinders being placed side by side, and both connected in the ordinary manner with the main driving axle. The steam from the boiler is admitted direct to the steam chest of the high-pressure cylinder, and when exhausted passes through pipes in the smoke-box to the valve chest of the low-pressure cylinder, whence it is exhausted up the blast pipe in the ordinary manner. The pipes between the cylinders form a receiver, and being in the smoke-box serve as an intermediate superheater to dry the steam.

In order to start the engine when the high pressure side is on or near the centre, a special valve is used to admit steam from the boiler direct to the low-pressure valve chest. This valve is termed the "starting valve," and may be arranged to act automatically whenever required, or can be operated by the engine runner.

The starting valve is shown very clearly in figs. 1, 2 and 3. Fig. 1 is a plan of the right-hand side of the smoke-box, showing the main steam pipe running to the high-pressure cylinder. A branch from this pipe leads to the starting valve. Fig. 2 shows the manner in which the starting valve is worked by a handle in the cab. When the handle shown is drawn back a small valve kept to its seat by a spring and the pressure of the boiler steam is lifted off its seat, admitting steam to a small piston. The pressure pushes this piston forward, when it uncovers a small port, which admits steam to the receiver, which forms a steam pipe for the low-pressure cylinder. The starting valve piston at the same time actuates a rod and lever connected with a flap valve in the receiver or pipe connecting the high and low-pressure cylinders. This flap valve is termed the "intercepting valve" and is specially

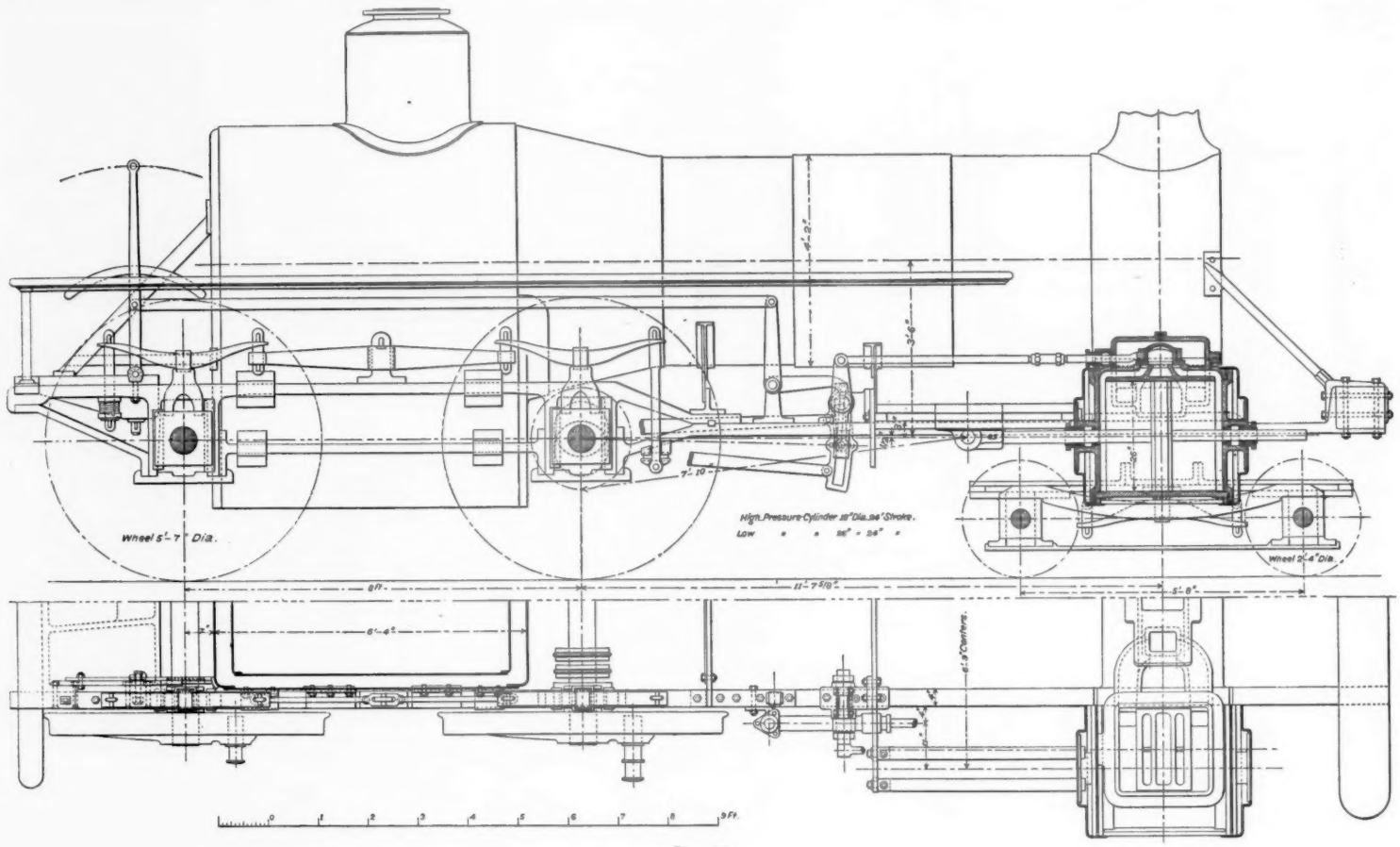

Fig. 10.

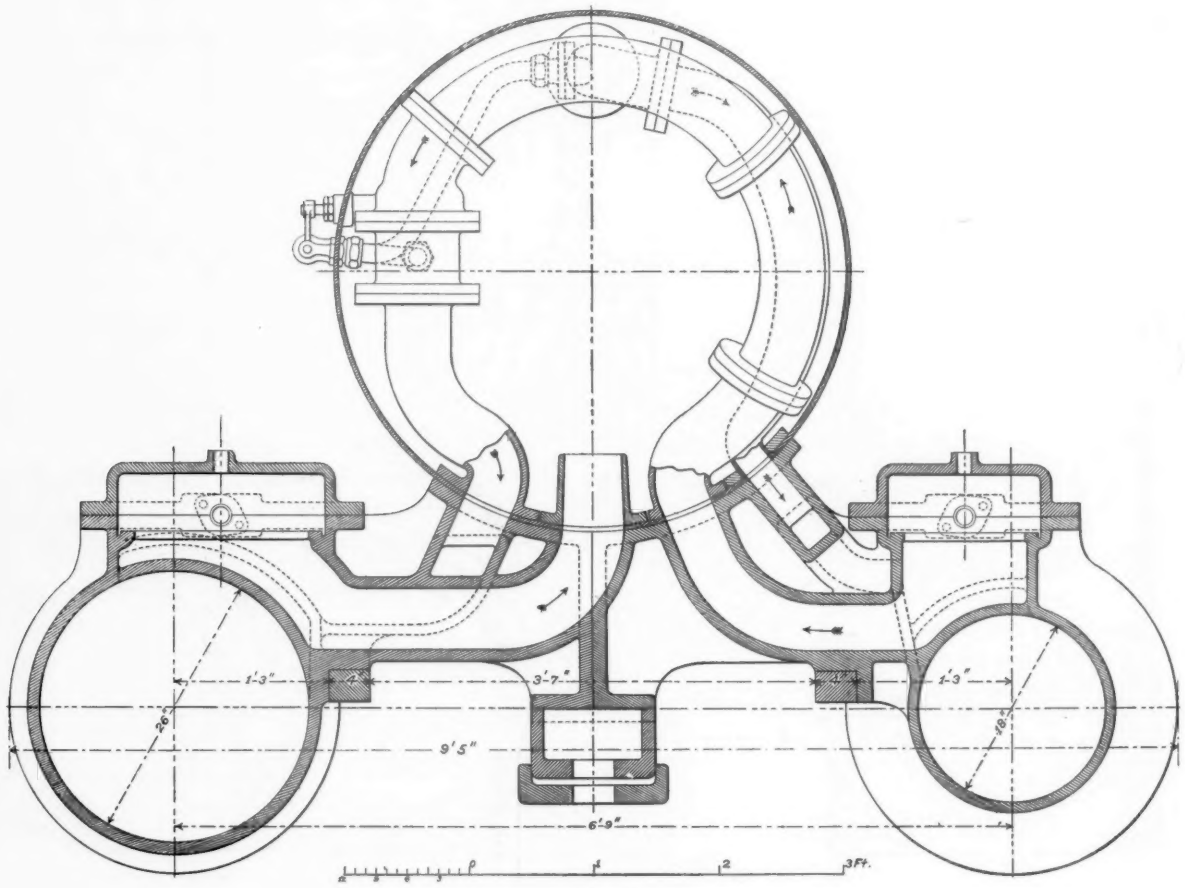

Fig. 11.

THE WORSDELL AND VON BORRIES SYSTEM APPLIED TO AN AMERICAN TYPE LOCOMOTIVE.

designed to prevent the high-pressure steam admitted to the low-pressure cylinder flowing back to the exhaust side of the high-pressure piston and so creating an excessive back pressure.

The intercepting valve is shown on an enlarged scale in figs. 4, 5 and 6. The connection with the starting valve is shown in figs. 1, 2 and 3. The starting valve is shown on an enlarged scale in fig. 7, and its action will be more clearly seen from this view than from figs. 1, 2 and 3, which are necessarily on a reduced scale. The starting valve consequently admits steam to the low-pressure cylinder and the intercepting valve prevents that steam exerting any excessive back pressure on the high-pressure piston. When the engine starts, the handle of the starting valve is released by the runner and the springs again seat the valve and prevens the boiler steam having access to the low-pressure piston. The exhaust from the high-pressure cylinder opens the intercepting valve, and after thefirst stroke of the pistons the locomotive again works as a compound engine, nod steam being admitted direct from the boiler to the low-pressure cylinder.

It is obvious that if full boiler pressure were admitted to the low-pressure piston, which is generally abont 26 in. dia., much damage would result. Safety valves are therefore provided on the low-pressure cylinder, and being set at 100 lbs. per sq. in., prevent any excessive pressure on the large low-pressure piston.

Figs. 8 and 9 show the arrangements as applied to inside connected locomotives on the Northeastern (England). The arrangement and size of the cylinders, etc., is exactly the same on both freight and express engines. The engravings show clearly the relative position of the cylinder, valve chests, exhaust pipe and starting and intercepting valves. Fig. 8 is a longitudinal section through the centre of the smoke-box and fig. 9 is a cross section. It will be seen that when the engine is running the steam from the boiler flows through the steam-pipe to the steam chest of the high-pressure cylinder. Fig. 9 being a section through the exhaust port, shows that the steam, when exhausted from this cylinder, flows through a curved pipe to the other side of the smoke-box, where the intercepting valve is situated. When the engine is fairly started, this valve is open and the steam enters the low-pressure valve chest. The manner in which the exhaust takes place is clearly shown.

Figs. 10 and 11 show the Worsdell and Von Borries sys-

tem as applied to an American locomotive. It will be seen that the arrangement and location of the cylinders and valve gear is precisely the same as that on ordinary American locomotives, and that the increased diameter of the low-pressure cylinder does not unduly increase the total width of the engine. The application of the compound system does not disturb the existing parts of the engine nor the distance apart of the centres. The only alteration which is advisable in existing parts is to make the cut-off in any given notch slightly earlier in the high than in the low-pressure cylinder. This may be easily effected by shortening the lifting link on the high-pressure side so as to give an earlier cut-off, the difference being about 10 per cent.

Numerous indicator diagrams have been taken on the compound locomotives running on the Northeastern (England). These diagrams give very satisfactory results, and show that the power is very evenly distributed between the two cylinders.

Careful trials made between two express engines, one compound and one non-compound, show the following results:

	Compound Pounds.	Non-compound. Pounds.
Weight of cars	358,400	358,400
" engine tender	182,200	160,600
" train, total	540,600	519,000
Coal burnt per train mile	28.3	35.9
Water evaporated per pound of coal	8.25	8.00
	Miles.	Miles.
Total train mileage	892½	892½
Average speed per hour	32.3	32.3
Weather	Very heavy wind and snow.	Heavy wind.

These trials took place between Heaton Junction and Tweedmouth, a portion of the line which runs along the cliffs bordering the sea coast, and is much exposed to heavy gales of wind. The economy of coal was 21 per cent., but possibly this is partly due to the superior weight of the compound locomotive. This cannot be said of another trial with freight trains, where ten compound engines were tried against ten non-compound engines with precisely similar boilers, valve gear, etc., the only difference being in the size of the cylinders. The non-compounds had two 18-in. cylinders, and the compounds had one 18 in. and one 26 in., as shown in the accompanying illustrations, figs. 8 and 9.

The ten non-compounds ran 186,890 miles, and consumed 3,411.4 gross tons of coal, showing a consumption of 40.9 lbs. per mile. The ten compounds ran 185,091 miles and burnt 2,886 gross tons of coal, giving a consumption of 34.9 lbs. per mile. The saving, therefore, was 6 lbs. per mile, equivalent to 14½ per cent. The saving in coal amounted to 525 gross tons, the cost of which in many parts of the United States would repay the whole extra cost of the compound locomotive. These figures are based on the consumption during the first 18,500 miles run by each engine, and probably the consumption would be still lower when the engine runners had become better acquainted with the best method of working the compound engine.

A large number of these engines are now at work in different parts of the globe, especially in England, Germany, Austria, Russia, India and South America, and the results obtained serve to confirm the figures given above.

English and American Railroads Compared in Operating Expenses.

At the last meeting of the American Society of Civil Engineers (Dec. 5) the following paper, by Mr. Edward Bates Dorsey, was read. It is supplementary to the paper for which Mr. Dorsey received the Norman medal of the Society in 1885, and which, with discussion and additional matter, was published in book form by Messrs. Wiley & Sons last year. We have taken the liberty to correct several obvious misprints which crept into the advance copy issued by the society. Mr. Dorsey's manuscript is sometimes a little difficult, and as he is not now in the United States the proofs were not revised by him.

For the information of a very prominent official and large shareholder in English railroads, the author made some of the following comparisons. The result was so astonishing that he decided to enlarge upon it, and make a short paper, in hope of getting the subject freely discussed. The English and American practice differs so widely that both cannot be right; engineers and railroad officials should discuss it freely, and adopt the principle that is the best and most economical, regardless of its nationality

When the author commenced this investigation over five years ago it was with the intention of showing the American engineers that it was the best policy to build good roads at first, as the English do, and save in the cost of operating expenses. The author then thought that it would be possible on roads with large traffic, to save more than the additional interest charge, but as the investigation progressed, he was greatly astonished to find that the Americans were operating their roads much cheaper than the English, though built probably at less than one-fifth of the average cost of English railroads. * * *

It is now more than three years since his first paper entitled "English and American Railroads Compared," was read before this society. Since then the subject has been much discussed by the press and railroad officials. About the only thing that has been said against it is, that it was based upon assumed data; in reality all the important figures given in it were from official sources, except the tonnage and passenger mileage; unfortunately the English roads do not give these. In reference to this the author will quote from his first paper or book, page 16: "No return of these all-important items for comparison is made in England. The author, after careful inquiry and investigation, decided that the average freight charge on all freight moved in the United Kingdom was about 1¼ pence, or 2.5 cents per mile per ton; but in order to be conservative he has taken the average charge at 1 penny, or 2 cents per ton per mile. In order to get the ton-mileage the receipts from freight, as reported by the companies, in pounds sterling, has been multiplied by 240" In the supplementary paper a year later, and after more thorough investigation had been made, the author said on page 110: "He hoped that the English railroads which are so largely interested in this question will promptly replace his estimate of ton and passenger mileage by their official figures. Until this is done he claims that these figures should be accepted as correct." Since this was written it has been investigated for two years more, fully confirming the preceding opinion and data.

All the data and figures in this paper are taken, for the English roads, from the "Board of Trade Railway Returns," or "General Report," and for the American roads from "Poor's Manual" or the annual reports of the companies.

In traffic expenses the Pennsylvania Railroad includes "rates and taxes," and "compensation for personal injury" and "compensation for damage and loss of goods," amounting to $322,370 for 1887, which should be deducted to make it correspond to the English roads, as on them they are not included in traffic expenses.

In the table the five principal English railroads have been selected. Among the American railroads the Pennsylvania Railroad Division has been selected as representing the best constructed American road, and the Knoxville Branch of the Louisville & Nashville system as a sample of the cheaply constructed class, both running through a comparatively rough country. Both of these roads have most of their traffic in one direction. This reason is very frequently given by English officials for the high freight rates on their railways. At first the author included in the Pennsylvania system the Philadelphia & Erie and the United Railroads of New Jersey divisions, but, on reflection, he thought best to exclude them, as it might be said that the level or easy grades on these roads were particularly favorable to cheap transportation. The Pennsylvania Railroad Division was retained, as it traverses a broken country with many heavy grades, and one summit of 2,154 ft. above tide.

In absence of official data as to the average charges for transporting one ton of freight one mile on the English railroads, the author has assumed that the average charge is one penny, or two cents, per ton per mile, being the same figures he has given, which figures have not been contradicted in any way, but have been repeatedly confirmed. These comparisons speak very strongly in favor of the American system. The high terminal charges (including receiving and delivering freights by carts), is generally given as an excuse for the very high freight charges in England. Paragraphs 10 and 11 shows that there must be other reasons than these. In absence of any data as to what this expense amounts to, the author has in paragraph 10 deducted from the operating expenses of the English railroads everything included under the name of "Traffic Expenses" (coaching and merchandise); this must certainly include all terminal charges and cartings. On the American railroads no deductions of any kind from the total operating expenses have been made; notwithstanding this, there is still a very large percentage in favor of the American roads, on the Pennsylvania it being 56 per cent. in its favor, compared with the London & Northwestern.*

In paragraph 11 all traffic expenses (coaching and merchandise) have been deducted from the operating expenses of all roads; this shows a very large percentage in favor of the American railroads.

Paragraph 6 shows the error in the statement usually made that the English railroads are operated more economically than the American, on account of the operating expenses of the English roads being about 52 per cent. of the earnings, while the American roads are about ten per cent. higher. If the earnings on both roads were derived from the same charge for moving freight, the operating expenses of the Pennsylvania road would be only 21 per cent. of the earnings against 52 on the London & Northwestern, or 148 per cent. in favor of the American road.

It is frequently stated that the English railroads are operated more cheaply than the American, because the train mile on the former costs somewhat less than it does on the latter, which is entirely wrong, if proper allowance is made for the difference in the average number of tons in the train load, which average, as per paragraph 3, is 79 tons on the London & Northwestern, against 207 on the Pennsylvania. Paragraph 13 shows that if proper equation is made for the heavier load, the cost per train mile will stand on the London & North Western $0.6588, against $0.3365 for equal load on the Pennsylvania, or 96 per cent. in favor of the latter.

There must be some cause for this great difference in the operating expenses of these roads; in the author's opinion the following are the principal reasons:

First.—Too light loads to the English trains, both freight and passenger.

Second.—The universal use on American roads of rolling stock with bogie trucks, which move with much less friction and wear and tear than the rigid wheel base rolling stock used by the English railways.

Third.—The use on the American roads of freight cars carrying a much greater percentage of paying load to dead weight than the wagons used on the English railways.

Fourth.—The great speed at which the English freight trains run.

Fifth.—The use on the English roads of light locomotives, with inside connections that cannot be as cheaply or as easily repaired as the American locomotive, with its outside connections.

Sixth.—The custom on the English railroads of giving each individual shipper the exclusive use of a freight wagon, even for very small quantities of goods.

The Pennsylvania Railroad Division is one of the few American railroads that approximate in thoroughness of construction to the average English roads. Even on this line there are many cheap station buildings, platforms, etc., that require constant repairs and renewals. Consequently their maintenance is more expensive than the permanent masonry structures on the English roads. This applies still more forcibly to the inferiorly constructed American roads.

Of the 150,000 miles of railroads in the United States, it is safe to say that there is not 5 per cent. of them ballasted up to the English average standard, and perhaps more than one-half of the remainder without any pretense whatever to ballast.

The large English railroads are very similar to each other in the general details of their operations; this is shown by the preceding table. From all the data that is available it appears that the cost of transporting one mile, one ton or one passenger, is about the same on the principal English railroads. The question has been frequently asked, "How can the English railroads pay the interest on their great cost, unless they continue to charge their present high freight rates?" This is entirely foreign to the object of this paper, which proposes only to discuss the cost of operating expenses in the two countries. The author is, however, thoroughly convinced that on the English railroads large reductions could be made in the present freight rates and cost of operating expenses without diminishing the present dividends in the least. On the English railroads there is a great variety of rolling stock, differing very widely; this is especially true regarding the locomotive. It is not possible that these different varieties, differing so very much, can all be equally good. It is strange that the best type has not been selected and generally adopted, especially on the same road. During a recent visit to Stoke-on-Trent the author was told by the Duke of Sutherland, in reply to the question why he did not work his coal and iron mines more extensively, as the situation was very favorable for producing

* Being 144 per cent. in favor of the Pennsylvania Railroad when compared to the London & Northwestern.

ENGLISH AND AMERICAN RAILROADS COMPARED IN OPERATING EXPENSES.

In the following table the figures are from operations for 1887.

The American roads taken for comparison are the Pennsylvania Railroad Division of the Pennsylvania & Knoxville Branch of the Louisville & Nashville.

All figures representing cost are in cents, except the average cost per mile of railroad operated, which is in dollars. £1 = $4.80. 1d. = 2 cents.

The numbers in the first column by which the lines in the table are designated are thus explained:

(A) Average cost per mile of road operated, in dollars.
(1) Per cent. of total ton-miles moved East.
(2) Per cent of total ton-miles moved West.
(3) Average freight-train load, long tons.
(4) Average charge for transporting one ton one mile, cents.
(5) Percentage of operating expenses to earnings.
(6) Percentage of operating expenses to earnings on the Pennsylvania Railroad Division, provided it charged the same rates for freight as are charged on the English railroads, viz., 1d. = 2 cents per ton per mile.
(7) Percentage of increased earnings that the Pennsylvania Railroad Division would receive if worked with present operating expense and received the same freight rates (1d. per ton per mile) as the English railroads now receive, = 545.
(8) Percentage of traffic expenses (coaching and merchandise) to total operating expenses.
(9) Average cost of transporting one ton one mile. The cost for the English railroads is found by multiplying the estimated charge of 1d. per ton per mile by the percentage of operating expenses to the gross earnings, as per paragraph 5 above.
(10) Average cost of transporting one ton one mile, deducting on the English railroads all "Traffic Expenses" (coaching and merchandise), and deducting nothing from the total operating expenses of the American railroads; cents.
(11) Average cost of transporting one ton one mile, deducting all "Traffic Expenses" (coaching and merchandise), on all roads.
(12) Average cost of train mile—freight and passenger; cents.
(13) Equated cost of train mile on the English railroads, provided they transported their present train loads at the same cost per ton per mile as is done by the American railroads, to which they are compared; cents.

	Pennsylvania.	Knoxville Branch.	London & Northwestern.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.	Great Northern.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.	Midland.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.	Great Western.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.	Great Eastern.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.	United Kingdom.	Percentage in favor of Penn'a.	Percentage in favor of Knoxville.
(A)	.....	$39,190	$255,888	.....	.....	$195,500	.....	.....	$255,727	.....	.....	$161,030	.....	.....	$212,895	.....	.....	$207,408	.....	.....
(1)	74	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(2)	26	70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(3)	207	154	79	162	96	60	245	157	61	240	152	64	223	140	62	234	149	70	196	120
(4)	.67	.90	2.00	200	120	2.00	200	120	2.00	200	120	2.00	200	120	2.00	200	120	2.00	200	120
(5)	63	58	52	.....	.....	56	.....	.....	52	.....	.....	49	.....	.....	53	.....	.....	52	.....	.....
(6)	21	.....	148	.....	.....	148	.....	.....	148	.....	.....	148	.....	.....	148	.....	.....	148	.....	.....
(8)	35	32	36	.....	.....	34	.....	.....	34	.....	.....	31	.....	.....	31	.....	.....	31	.....	.....
(9)	.426	.504	1.04	144	106	1.12	163	122	1.04	144	106	.98	130	94	1.16	149	110	1.04	144	106
(10)	.426	.504	.666	56	32	.739	74	47	.686	60	36	.676	59	34	.731	72	45	.718	60	43
(11)	.277	.343	.666	140	94	.739	167	116	.686	148	100	.676	144	97	.731	164	113	.718	160	109
(12)	85.37	71.00	65.88	.....	.....	55.42	.....	.....	53.40	.....	.....	58.10	.....	.....	56.04	.....	.....	60.52	.....	.....
(13)	.....	.....	Cost..... 33.65	.....	.....	Cost..... 25.56	.....	.....	Cost..... 25.99	.....	.....	Cost..... 27.26	.....	.....	Cost..... 26.91	.....	.....	Cost..... 29.82	.....	.....
			Per cent. 96	96	65	Per cent. 117	117	83	Per cent. 113	113	80	Per cent. 113	113	80	Per cent. 112	112	79	Per cent. 100	100	72

cheap coal and iron, he replied that the railroad freights were nearly prohibitory, being to Liverpool—55 miles—7 shillings = $1.75 per ton, or 3.2 cents per ton per mile; compare this with the charge on the Louisville & Nashville Railroad of $1.40 per ton from Birmingham to Mobile, 280 miles, or half a cent per ton per mile, or one-sixth of the English charge, and this over a much inferiorly constructed road.

A prominent railroad official gave the usual reason for this high freight rate, that it was owing to the high terminal charges at Liverpool. There was none at Stoke, the iron being loaded into the cars by the furnace company. No data is given by which these terminal charges can be ascertained, but to be certain that we get all of them, let us deduct from the operating expenses all the "Traffic Expenses" (including coaching and merchandise), 36 per cent., as in paragraphs 8 and 10 of the preceding table, this will leave $1.12 as the freight charge, or over two cents per ton per mile, after deducting all traffic expenses. Compare this with the rate on the Louisville & Nashville Railroad of half a cent per ton per mile, and without any deduction whatever from the total operating expenses.

The preceding percentages of the American railroads would be very largely increased, if proper allowance be made for the higher wages paid, their difference in first cost—fully one to five, and consequently inferior construction, and their perishable wooden buildings and bridges. * * *

The Porter Regenerative Gas Lamp.

The accompanying cut shows the general appearance of a new gas lamp recently completed by the American Lighting Co., of 120 Broadway, New York City. In general principle this lamp does not differ from a number of burners already in the market. It is so constructed that the waste heat of the flame is very largely communicated to the air and the gas which are entering the lamp preparatory to combustion. These both become heated to an intense degree, and when so heated their combustion or combination is rapid, and an intense light is produced.

The peculiar features of this lamp are in the details of its construction. It is made in the strongest manner, of metal and thoroughly durable material, and it has been designed and developed throughout for the particular purposes of railroad service. Most lamps using this regenerative principle are of large capacity and are bulky and ill designed for so small a space as a car. In addition to this they are uniformly sensitive to draught, and flicker and smoke, or perhaps even go out when subjected to the disturbances which are continually taking place in the atmosphere within a car. This lamp has been especially constructed to escape these difficulties. The passages whereby the air enters the body of the lamp are so distributed and designed that even a severe draught may blow against them without the flame being affected, and the chimney is provided with a smoke bell and cowl similarly designed to preserve the draught intact, whatever may be the conditions surrounding it. In practice the lamp is used precisely as any other chandelier might be. It is attached to the roof of the car, and the gas reaches it through one of the arms, which is hollow, and provided with a key, and also with a small governor valve to automatically prevent its ever being turned too high. The flame of the lamp is inverted, and is therefore fully exposed in the direction in which the light is used. The lamp casts no shadow except a faint one above it on the ceiling, and when several of the lamps are used, as would, of course, be the case in a car, this space is lighted by the others so that the car is evenly lighted, and the illumination is completely unobstructed between the lamps and the passengers.

The lamp chimney is carried close to the head-lining and the waste passes into a double smoke bell extending through the roof, and escapes through an outside ventilator which at the same time sucks air from the space around the chimney. This arrangement insures not only the complete removal of the products of combustion but also a thorough withdrawal of all air heated by contact with the lamp. In addition to these devices for preventing the heating of the car, the lamp is provided with a double set of glass shades surrounding the flame and hot parts, and the space between these shades is connected with the chimney in such a way as to secure a constant passage of cool air between the globes. These are carried upon a single hinged ring, the mechanical arrangement of which is such that they can be turned open by a single motion of a key attached to the brakeman's torch, the gas ignited by the same torch, and then the globes closed to place. The whole operation of starting the lamp is simple and easy.

The makers of the lamp have been enabled to experiment with it in regular car service during the whole time of its development, and have therefore brought it to a state of practical usefulness seldom to be found in a new thing. It has received severe tests in practice, and is in every case perfectly manageable and quite free from the objectionable fluctuations so common to car lamps. A number of these lamps have been tested recently to determine their actual and available lighting power; and for comparison some ordinary lamps and burners were similarly examined. The standard of comparison is in each case the normal or test candle used for such purposes. The results are summarized in table A.

The No. 1 lamp referred to in the table is the standard car size. The No. 2 is larger, and for station and shop use mainly. This table gives the means of comparing the light obtained from these lamps with that of any car now using lamps—and used in connection with table B., will enable any one to make an approximate estimate of cost, and other important items of gas service in cars. For example, a car now uses ten oil lamps; these certainly do not give over 110 c. p. total, or 90 available. Two gas lamps would give more available light than the above, but as most cars are under-lighted and should have the light thoroughly distributed, three or four gas lamps could be used with success, and would give a light at least double that of the oil lamps.

THE PORTER CAR LAMP.

The cost of lighting a car can be quickly estimated from the consumption of gas given in the tables. The car gas referred to is common oil gas such as is made by the Patton, Foster, Pintsch and other methods, which has been compressed to 300 lbs. and stored in cylinders. In ordinary use one of these cylinders—or two for through cars—is hung under the car, and the gas drawn from it to a pressure reducing governor and thence to the lamps. Such gas costs about $2 for 1,000 ft. compressed and delivered to the cars, and is over twice as rich as uncompressed city gas, and therefore much cheaper. The lamps burn either gas with almost the same results, differing only in the quantities consumed.

Table A.

	Candle power in best location.	Candle power available in car use.	Feet per hr. of car gas.	Feet per hr. of ordinary city gas.
Shop and station size.				
Average of three No. 2 lamps	120	118	4.1	8.3
Best " " " "	126	123	4.3	8.7
Car sizes.				
Average of ten No. 1 lamps	49.5	48.5	2.3	4.4
Best " " " "	54 7	53.7	2.5	5.0
Worst " " " "	43.7	42.9	2.1	4.1
Standard kerosene car lamps.				
New oil and wick—best	10.4	6.7	.....	.....
" " " average	7.2	5.0	.....	.....
" " " after 3 hours	4.4	3.0	.....	.....
" " " " 7 "	2.0	1.3	.....	.....
Best gas jet.				
Two feet small	5.8	4.6	1.4	.....
" " large	3.2	3.0	.....	2.6

Table B.

No. of lamps in car	3	4	5
Candle power	150	200	250
Hours full service (One 9 ft. gas cylinder.)	30	23	18
Hours full service (Two 9 ft. cylinders.)	60	46	36
Nights service (One cylinder.)	4	3	2
Nights service (Two cylinders.)	8	6	5
Cost per car hour	1.4-5c.	2.2-5c.	3c.

The most striking feature of this lamp is its economy, which is fully equal to that of the best stationary lamps of its class.

It produces a given light with the consumption of but one-quarter as much car gas as would be required by an ordinary burner, and with city gas the results are even better. This would be a great economy even in common use, but on cars its effect is doubled, for the quantity of gas a car can carry is limited, and as now used only a few hours of good light can be obtained with one supply. By using this lamp a cheaper light is secured, and the gas supply is made to last four or five times as long. This will enable through trains to make full return trips with a single supply, and by reducing the number of gas works needed will lessen the cost of equipping a road with gas—the cheapest, safest and best car illuminant known.

The Ross Anti-Freezing Steam Trap.

The Ross steam trap which we illustrate is offered as being especially adapted for use in steam heating of railroad cars. The device is thus described: The expansion tube *A*, protected from violent changes of temperature by the non-conducting sheath *M* and a light sheet iron jacket *O*, is connected by screw ends to the valve chamber *C* and the head *G*, forming the operating principle and power of the apparatus, by expansion and contraction of the tube due to varying temperatures within. The tube *A* being composed of a metal having the greater range of expansion, the valve *E* and the valve rod *F* of metals having a less range of expansion, and the rod *F* being exposed to the outside temperature affords the full effect of the principle, which operates as follows: The length of the valve *E* and the rod *F* remaining practically constant, a certain contraction of the tube *A* will carry the valve seat *D* away from the valve and open a passage through *P*. The lug on the head *G* is provided with a graduated scale *H*, each space of which equals the range of expansion of the tube for variations of 10 degrees of temperature, and this scale, together with the index-pointed washer *I*, which turns with the screw end of the valve rod *F* under a jam nut, as shown, renders the trap capable of accurate adjustment to discharge at any desired temperature. For instance, the outside temperature, and that of all the parts being 60 degrees, and the trap in use required to discharge at 210 degrees; deduct 60 degrees from 210 degrees, which leaves a range of 150 degrees between the existing temperature and that at which the trap is required to dispose of its condensation; then by closing the valve *E* against its seat and turning it back from that position until the index point *I* has passed over 15 spaces of the scale *H*, the trap will be adjusted to open at all temperatures below 210 degrees, and closed at all points above that degree. The plug *L* closes the opening through which the valve is admitted and affords access for regrinding it when necessary.

This device is patented by George B. Ross, M. E., Buffalo, N. Y.

THE ROSS ANTI-FREEZING STEAM TRAP.

Burnt Clay Ballast.

It is well known that for some years burnt clay ballast has been used more or less by various Western roads. As long ago as 1881 the use of this material was begun on the Chicago, Burlington & Quincy, and it has since come into some use on the Hannibal & St. Joseph, the Wabash and the Union Pacific. The Hannibal & St. Joseph Railroad in Missouri has upwards of 100 miles of track ballasted with this material. The Chicago, Burlington & Quincy has 50 miles in track, and about 15 miles more on hand ready to use. That road is increasing its use of this ballast every year.

It is claimed by the makers and by some users that burnt clay is cheaper in first cost than broken stone, and one official states that it costs $1,200 per mile less, using 2,400 yards to the mile. Evidently this must depend somewhat on the special conditions of each case. Transportation and handling will obviously cost more for stone, with equal distances, as it weighs about 50 per cent. more than the burnt clay; but the cost of production of one or the other material will vary in different places. The same must be true in comparing this material with gravel.

The burnt clay ballast is found to be freer from vegetation than either broken stone or gravel, while its porosity insures rapid and thorough drainage. It is found to be elastic and, after the first rain, it is free from dust, qualities which make it easy on machinery and agreeable for passengers. It is no more subject to washing out than stone and less so than gravel.

Any clay suitable for the manufacture of brick or tile is available for ballast. Even should considerable impurities exist that would be injurious in the manufacture of brick, they are not detrimental to the ballast. Fat clay soils, such as the so-called gumbo of Missouri and Kansas, the black waxy clay of Texas, and the drift clay of Illinois, make the best quality of ballast.

In a general way the process of burning the ballast is as follows: After the selection of suitable clay a side track is laid for the delivery of fuel to the pit. A row of kindling wood, from 800 to 1,000 ft. long, is placed in position and set on fire. This wood is covered with coal. After the coal is well ignited it is covered with a layer of clay. When the fire penetrates this layer of clay another layer of coal (nut and slack coal mixed) is spread over it; to this is added another layer of clay, this operation being repeated until the pile is as high as it can be conveniently operated on. To burn well the clay should be damp when it is put on the fire. The coal used is generally bituminous nut and slack.

The Forestry Congress.

The American Forestry Congress and the Southern Forestry Congress both met at Atlanta, Ga., on the 5th inst., and the Southern branch was at once admitted to membership in the older body. In the report of the Corresponding Secretary it was stated that Kentucky and Tennessee were the Southern states which had taken most interest in forestry matters during the year. A call of states was made for statements as to laws and other points of interest on forestry matters. From New England it was reported that 15,000 farmers in those states belonged to the forestry association, and were actually at work endeavoring to have laws passed for the prevention of forest fires and the cultivation of trees. In New Hampshire the amount of timber has not decreased for the last ten years and about one half of the state is covered with forests. In Massachusetts a large amount of unimproved land is fit for nothing else but tree-growing, and it was recommended that it should be devoted to that purpose The forest area of Vermont is diminishing. The greatest injury to the timber is from forest fires.

In Alabama nothing, so far, has been done to preserve and reproduce the trees. The evils of forest fires are making themselves manifest, and the need of legislation is becoming apparent. The introduction of dry kilns has done good. In Minnesota forests are being so heavily cut that the need of laws is manifested. In Illinois Arbor Day is strictly observed. In Iowa there were in 1880 50 per cent. more forests than in 1860, owing to wise laws. Col. E. T. Ensign read a "Plea for Rocky Mountain Forests," in which he said that railroad building in the Rocky Mountain region, especially in Colorado, is increasing in such rapid proportion as to offer a most serious menace to the existence of the forests. After the tree-chopping legion come settlers, miners, lumbermen, charcoal burners and others, all of whom, in addition to the havoc wrought by themselves, prepared the way for the worst dreaded of all enemies, fire. The demand of the railroads for cross ties, timber and dimension lumber causes the most serious drain upon the forest, For ties only the young, partly grown and most vigorous trees are used. The consumption for these purposes alone is enormous. The timber so obtained, as compared with other available material, is inferior in quality. Cedar and oak ties, from the Southern, lake and Pacific forests, can be delivered in Colorado at a cost not exceeding one-third more than the native pine trees. The former are in every way superior, and their usefulness is at least double that of the latter. Therefore no hardship would be imposed in requiring railroads to draw upon other than the mountain region for their timber supplies.

General A. W. Greely read a paper on the "Rainfall of the Pacific Coast and in the Western States and Territories." This is part of his report as Chief of the Signal Service Bureau. General Greely treated at some length the relation of rainfall to agriculture and of forests to rainfall. He is of the opinion that "extensive forests slightly increase the rainfall of any country, but not to such an extent as is advanced by many."

Prof. N. H. Egleston, of Washington, read a paper on "Our Progress in Forestry." He finds an encouraging growth of public sentiment in favor of planting trees and of forest preservation.

A number of papers were read by title, including one by Mr. E. E. Russell Tratman on the "Relation of Railroads to Forestry."

THE SCRAP HEAP.

Notes

The competition in speed between Philadelphia and Washington has now been carried one notch further, the Baltimore & Ohio announcing that the time of its trains between the two cities will be reduced to three hours.

A Los Angeles (Cal.) dispatch states that 100 conductors in that vicinity have become dissatisfied with the Order of Railway Conductors, and have organized a new association, which they will endeavor to propagate in the East.

Burning of the Steamer "Maryland."

The transfer boat "Maryland," whose name is familiar to many railroad men, was burned at the wharf of the New York, New Haven & Hartford, at "Harlem River," near Second avenue and 133d street, New York City, on Friday night Dec. 7. Two sleeping, one passenger and one baggage car, constituting the regular night express from Washington to Boston, were upon the boat, and there were about 50 passengers in them, many of whom were asleep. The steamer left Jersey City about 10 o'clock and had just arrived and made fast to her slip at 11:10 P.M. when the fire broke out. It originated in the kitchen of the boat and spread so rapidly that the passengers had to flee for their lives, some of them being cut-off from access to the shore and escaping only by the aid of a tugboat, which took them off from the outer end of the steamer.

The two sleeping cars were pulled off the boat, but not in season to save them. The woodwork of the boat was wholly consumed, leaving the iron hull bare in the water. The passengers, some of whom were clad only in their night clothes, afterwards held a meeting in the waiting-room of the station and passed resolutions appreciative of the good treatment received at the hands of the railroad employés.

The "Maryland" was built in 1853 and was used to transfer the trains of the Philadelphia, Wilmington & Baltimore across the Susquehanna River at Havre de Grace, Md. During the war she was used by the Government as a dispatch and naval supply boat. After the completion of the bridge at Havre de Grace she was laid up for some time, and in 1876 was brought to New York Harbor and put upon the service in which she has since been engaged. The through passenger line between Boston and Philadelphia over the New York & New England, New York, New Haven & Hartford and Pennsylvania, which was then established, and which carried large numbers of passengers to the Centennial Exhibition, has been the only line without change of cars between the termini named, and as there is no other craft immediately available for transferring passenger cars the line would seem to be now seriously interrupted. In fact the service has been intermitted once or twice for considerable periods when the "Maryland" has been taken off for repairs. The steamer was of 1,093 tons burden and had track room for 8 passenger cars. She was 230 ft. long by 65 wide, and was manned by a crew of 28 men. The transfer business from the New York, New Haven & Hartford to the Pennsylvania and other roads terminating in Jersey City, has grown to be quite large, and most of the freight cars are now transferred by floats, drawn by tugs, the road having in service 7 tugs and 23 floats. It is stated that over 1,200 freight cars are handled daily.

Strikes.

The locomotive engineers of the Montana Union road, which is owned jointly by the Union Pacific and Northern Pacific, struck on Dec. 4, at Butte, Mont., on account of the action of Master Mechanic Ross, who had discharged three men and would reinstate only two of them. Dispatches of Dec. 6 stated that the master mechanic resigned and that the men returned to work.

The switchmen employed by the St. Louis, Vandalia & Terre Haute, at Brazil, Ind., struck on Dec. 7 for an increase of pay from $1.70 to $2.10 per day. On Dec. 8 they were all discharged, but the men employed in their places were frightened away. On Monday of this week a compromise was effected and the men returned to work at $1.90 per day. There are a large number of short coal branches in this region and coal traffic was stopped for a short time.

The switchmen's strike at Indianapolis was finally given up last week. As incidentally showing that like effects result from like causes we quote the following from an Indianapolis paper: "About four months ago four switchmen from Chicago came to this city and got work. They were members of the Switchmen's Union at that city and as soon as they came here began to urge the local switchmen to form themselves into a branch of the union. Their first effort failed, but a later one succeeded. As soon as the organization was on its feet, these four men began to talk at the meetings about Chicago wages, and to insist on the Union, as a body, making a formal demand on the companies for the same wages here. The local switchmen were very well contented, but the Chicago men kept hammering away and soon began to make converts. They felt, though, that unless they could get most of the switchmen into the union they could not succeed in their plan, so they put off carrying it into effect several weeks while they 'drummed up' new members. Thus by persistence and much plausible talk a sentiment in favor of a strike was gradually fostered. * * A strike would not have been thought of, nor even dissatisfaction shown in more than individual instances, had not the disturbing influence of the Chicago men come in."

On Tuesday of this week the switchmen in the yards of the Pennsylvania Company, at Toledo, O., struck for an advance of pay to bring their wages up to the recently advanced scale of the Lake Shore On the following day it was said that they returned to work at an increase somewhat smaller than they asked for. The men on the Cincinnati, Hamilton & Dayton and the Wabash also made complaints and stopped work for a short time, but matters seem to have been patched up, temporarily at least.

Large numbers of the former switchmen of the Chicago, Burlington & Quincy, at Chicago, who struck several months ago, are said to be in the city and still out of work. On Monday last they met and declared the strike off.

Railway Mail Service.

The President has placed the employés of the Railway Mail Service under the rules of the Civil Service Law. The service now contains about 5,200 officers and clerks, all of whom, with the exception of the General Superintendent and his assistant, will be brought within the classified service. It is not proposed to require clerks now in the service to pass an examination in order to retain their positions, but their efficiency will be periodically tested by a practical examination. It is stated that Postmaster General Dickinson will recommend that several tests of capacity be applied besides the purely literary one. Quickness, agility and endurance are prime requisites and Mr. Dickinson favors allowing the examiners to give a certain number of marks upon an applicant's general bearing and intelligence. Examinations will be held by Congressional districts, and in making appointments the preference will be given to eligible candidates living on the route where the clerk is to run. It is assumed that he will already have some knowledge of the geography of his own section, and that what he lacks he will acquire by his experience as a substitute before he is put on the regular force. The probationary period will be six months, as at present.

The Inter-state Commerce Commission.

The Secretary of the Interior, in his annual report recommends that the Inter-state Commerce Commission be made independent of his department. He says: "I desire to renew the recommendation of my predecessor in office in the last annual report, that this commission be made independent of the Department of the Interior, required to report directly to the President or to Congress, and authorized to appoint its own officers and employés, and to deal directly with the Treasury in the expenditure of and accounting for the appropriations made for its support.

"The character of this commission, as indicated by the nature of the duties assigned to it by law and the manner of its appointment, which it may be safely expected will always secure maintenance of its constitution upon the present high plane, renders this a measure of personal justice. Besides that, the duty of determining upon the appointment of its officers and employés on appeal, as it were, from the commission itself, is invidious and irksome; nor is the Secretary of the Interior able to decide the questions involved, except by requiring an exhibition of the circumstances and conditions which affected the judgment of the commission in making appointments or expenditures. He cannot well have any satisfactory or trustworthy means of independent inquiry. His duty must therefore either be perfunctorily performed, in which case it is still more disparaging to the character of the commission, or it must be performed in the exercise of a superintending authority without means of judging as satisfactory as those possessed by the commission whose action he reviews."

Live Load.

A dispatch from Bridgeport, Conn., says: "A new iron bridge over the Pequonnock River was completed to-day. A test was made by a steam iron roller weighing 17 tons. Following this 12 of P. T. Barnum's heaviest elephants, weighing an aggregate of 40 tons, were driven upon the structure. This vast weight served to produce only a slight wavering." This test suggests the method of a fat engineer who, when a member of a certain state railroad commission, used to try the vibration of bridges under the weight of his own ponderous bulk.

TECHNICAL.

Steel and Aluminum Bronze Heavy Cast Guns.

The failure of the Hainsworth cast steel gun is very unfortunate, though not at all conclusive against the use of cast steel for heavy ordnance. The cause of the failure in this case is not yet known, but we have the utmost confidence that cast steel guns will be made that will prove stronger and far more uniform and reliable than the expensive and irrational "built-up" gun. It may be as Mr. Hainsworth suggests, that the tempering of the gun was badly done or may have affected its strength, or it may be that some modification in the method of casting will be necessary. The old Rodman principle of making cast-iron guns is considered by such eminent authorities as Mr. William Metcalf to be the best for casting steel also, and perhaps the Gatling modification of the Rodman method, by which the gun, cast with a core, is cooled from the centre while the outside is kept at a high temperature, may bring the success which we are confident will before long be demonstrated. In a matter of such vast importance to the government it would be proper that a certain portion of the public money be appropriated to making a few experimental cast steel guns, and the further experience which Mr. Hainsworth has now acquired, added to his recognized great skill, would especially fit him to make the experiments at the public expense. Such experiments are too costly for private enterprise, and the Pittsburgh Steel Casting Co. has already expended a large sum in this first one.

While we have undiminished confidence in the possibility of making strong steel cast guns, we still see so many advantages in the use of the aluminum alloys, which are being made so successfully by the Cowles Electric Smelting Co., that we believe experimental guns should be cast of this material, and tested at the public expense. There can be no question of its immense superiority over the brass or bronze still used successfully in field guns, and the possibility of making perfectly homogeneous castings of an alloy which equals high quality of cast steel in strength, and greatly exceeds it in elasticity, has been fully demonstrated. Cast guns are the heavy guns of the future as of the past, and the difficulties which have occasioned the present "set back" are, we feel assured, of an avoidable character, and will be overcome.—*Engineering and Mining Journal.*

The Sioux City Bridge.

The Chicago & Northwestern bridge across the Missouri River at Sioux City was tested and formally opened to traffic Dec. 5. The bridge cost $1,500,000 and has been about 17 months building. It is a Pratt truss. It consists of four mains pans, with an approach span on the east side. The main spans are each 400 ft. long. The approach span is 61½ ft. The clearance is 54 ft. above water. There are five river piers going down 90 ft. below an average stage of the water. Mr. Geo. S. Morison is the Chief Engineer.

Prize Competition in House Heating.

The *Metal Worker* of New York offers $300 in prizes for designs for heating a country house. The designs are to be for heating by hot air furnace, by steam, or by hot water. Two prizes are offered for each class, a first prize of $60 and a second of $40 for each. These competitions are in continuation of a series which have taken place for the plan and elevation, the specifications and the estimate of cost for the same house. Plans and conditions are published in the issue of the *Metal Worker* of Dec. 8.

Electric Block Signals.

The Chicago & Alton has at two places block sections guarded by the Pennsylvania Steel Company's Magneto-Electric Semaphore, illustrated in the *Railroad Gazette*, Nov. 30, page 784.

The Gould-Tisdale Electric Signal.

A number of the automatic signals of the Gould-Tisdale Electric Railway Signal Co., of Boston, are in use on the Intercolonial Railway in New Brunswick, and more are being put in. They are in use as block signals and as automatic distant signals for the protection of a draw-bridge near Richmond, N. S. Three instruments are to be put in at Moncton, two at St. Favie, and four, constituting automatic blocks, at Spring Hill Junction. The line between Dorchester and Sackville will also be equipped. This signal was described and illustrated in the *Railroad Gazette* of Aug. 19, 1887, page 538.

A Bulky Carload.

Mr. F. W. Vanderbilt has recently placed in the sidewalk in front of his house on Fifth avenue, New York City, a flagstone 15 ft wide and 20 ft. long. It was brought from Oxford, Shenango County, N. Y., on a platform car especially prepared at the New York Central shops. The stone had to be loaded in a diagonal position, the bridges along the road preventing the transportation of anything extending more than 14 ft. above the car floor. This stone is not quite so large as the one placed in front of W. H. Vanderbilt's house, in 1881, which measures 15 × 25 ft. In 1883 a stone 15 × 26 ft. and weighing 35 tons, was placed in front of the Stuart house, Fifth avenue and 69th street.

Car Heating Notes.

The work of equipping locomotives and cars on the Canada division of the Michigan Central with the Martin steam-heating system is progressing rapidly. Already nine baggage, mail and express cars, 18 express cars, all the dining cars and nine locomotives have been equipped with the apparatus.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We are informed that the order has been issued that in future all freight cars of the Pennsylvania Company shall be equipped with an automatic coupler of the M. C. B. type, and that all box and stock cars shall be fitted with the air brake. Orders will be placed very shortly for 4,000 cars for freight service, all of which will be fitted with the Janney coupler, and all but 500 (gondolas) will have the Westinghouse brake. We understand that the latest form of draft-rigging of the Pennsylvania Railroad is especially designed to facilitate the change from their standard link and pin draw-head to one of the M. C. B. type as fast as it is found desirable to make such a change. The action of the Pennsylvania lines in this matter is of great importance. It carries weight from the high reputation of the mechanical departments of those lines, and will have a direct influence on connecting roads reaching over a great area. The dangers of coupling are certainly not diminished, and are probably increased where cars fitted with the old and the new couplers are brought together, while the benefits of close coupling are not realized. And so of the air brake, the advantages from its use are only to be fully felt when it is so generally used that freight trains can, as a rule, be controlled by it. These are among the chief obstacles to the rapid introduction of these particular improvements. We may expect, therefore, that their use will increase at an accelerated rate. Each new application of them helps to remove the objections to further applications.

The New York Central has restored west-bound through freight rates, and the other trunk lines have followed it; but the public is given no information in regard to the basis of the apparent agreement. Secret cutting of rates by the weaker lines was understood to be the cause of the reduction, but what promises of reformation those lines have given does not appear. East-bound rates, which were restored about the same time, were irregular, chiefly as regards grain, live stock and dressed beef. On the latter the Erie claimed 1½ cents greater differential than the other roads are willing to concede, and President King's statement on this point is the only fact in the whole negotiations that is given out. Mr. King is said to have insisted on a 43½ cent rate, when the other lines demanded that it be made 45, but with a proviso that if his road should get a larger share than was deemed fair the rate should be raised. The question what constitutes a fair share is apparently as far from solution as ever.

After several weeks discussion about Southwestern rates and the immense losses being sustained by the roads in that section, the gossips have been appeased and have quieted down on the assurance that freight rates from New York to Colorado points which have been secretly cut some 40 per cent. shall be henceforth maintained. It is reported that a Missouri Pacific directors' meeting, on the motion of an aggressive member who had become desperate, ordered rates maintained at paying figures regardless of competitors' action. As the total Colorado freight traffic affords but a very small percentage of the earnings of the roads in question, any legitimate ground for keeping up such a hulabaloo is still undiscoverable.

"Demurring to Demurrage" is the title of an item in a Chicago paper detailing some of the objections of the coal and lumber dealers and others to the collection by the railroads of pay for detention of cars; and similiar items appear in papers of other cities. The arguments are the old and familiar ones, and it is clear that the railroads must move with moderation in order that such a wide range of interests may be adjusted to the change with the least possible friction. That such moderation is being practiced seems evident from the absence of any extraordinary "kicking." The views expressed in the trade papers, such as the *Iron Age* and the *Coal Trade Journal*, are very moderate and reasonable, and the position of those railroad men who argue that the majority of consignees will in the end acknowledge that the change is a benefit, seems to be well taken. Pig-iron is taken to Chicago to be sold after arrival, and the dealers now have to sell it at lower prices than formerly because they have less time in which to turn themselves. This is where the shoe pinches. A similar condition exists in the coal trade, and the market price of soft coal is so low in Chicago that it is said that if it has to be re-handled after being unloaded it must be sold at a loss. On the other hand, it is predicted that dealers will now be careful not to order ahead, and that therefore the soft Western coal will have a decided advantage over anthracite and other Eastern coal, because it is so much nearer the market. But the larger dealers are said to be in favor of the new régime. Scarcity of cars continues to be reported at several centres. The heavy offerings of grain to be shipped previous to the advance in east-bound rates seems, however, to account for a considerable share of the shortage.

The Law Against Pooling.

During the past few weeks there has been much talk of an effort to secure the repeal of the pooling clause of the Inter-state Commerce Act. That such a result would be desirable we have no question. That it will come sooner or later we also believe. But we do not see the least reason to hope that it will succeed at the present session of Congress.

The men who most desire the repeal are those who have felt the destructive effects of the act during the two years of its operation. First, of course, are the railroad men themselves; and second are those who, without being directly engaged in railroad management, have an immediate personal interest in the financial prosperity of the country. It is in this class that the change of sentiment is most apparent. The railroad men, as a body, were opposed from the outset to the prohibition of pools. Lawyers and financiers, on the other hand, were quite willing to see the experiment tried, and not a few of them have been sincerely surprised at its failure. The position of this class of men was well illustrated by that of Mr. Simon Sterne. At the time of the passage of the act he said that he was willing to see pools prohibited because the operation of the act would of itself, in his opinion, prevent those practices which had made pools necessary. As long as pooling was the only means to prevent violent fluctuations and destructive rate wars, he was prepared to acquiesce in its existence. But when the Inter-state Commerce law interposed to avoid these dangers, he saw no necessity for the continuance of pools.

Unfortunately the Inter-state Commerce law has not avoided these dangers. Mr. Sterne has changed his mind, and has admitted it in a way that does credit to his candor. In a recent communication to *Bradstreet's* he says:

> "I am in favor of such a modification of the law as will allow such pooling arrangements as the Commissioners may sanction, and prohibit all others. My apprehension is that the determination of the railways that the provisions of the Inter-state Commerce act shall not work well in that and the long and short haul particular is so great, * * * that there is actual danger that the great step in advance which was made by the creation of the Inter-state Commerce Commission may be wholly retraced unless some concession is made in that regard."

This fairly represents the views of a large number of influential men. But, unfortunately, they are still in a most decided minority. A great many people are so situated that they do not feel the force of the existing evils. Of those who do feel their force, some, like the Inter-state Commerce Commissioners, do not admit that the law is to blame for their existence. Others, like the editor of the *Railway and Corporation Law Journal*, are afraid that the renewal of the pooling system would indirectly involve our railroads in worse troubles than those under which they at present suffer.

Among those who do not feel the force of existing evils must be counted a great majority of the voters of the West, and perhaps also of the South. As a rule, they have no interest in railroad property as an investment. To them any reduction of rates, however irregular, seems an advantage; any effort to maintain them, however strongly demanded by sound business policy, seems a public disadvantage. It is true that the Western farmers are a law-abiding, and in some respects, a conservative class, and do not deliberately wish to pursue a policy of confiscation. But they have heard so much said against corporations, and have in so many cases felt the arbitrary action of their agents, that they are not inclined to be over-careful in exercising their legislative powers of control. Nor, has the fall in railroad values, however marked, been such as to convince these men of their error. The fact that the Chicago & Northwestern, running through a section strongly affected by present legislation, and suffering in addition from a somewhat deficient wheat harvest, can go on without reducing its dividends, seems to them to prove that there has been no very severe destruction. The rather reckless development of new mileage, which, to the railroads themselves, has been one of the chief causes of trouble, is, for the present at any rate, something which prevents the farmer from feeling the existence of any such trouble. When the effect of legislation is such as to stop railroad building and cut shippers off from their needed facilities, then it will produce a reaction. This was the experience in the upper Mississippi Valley in the years 1874 and 1875. But until this result comes about, it is useless to expect the shipper to feel the force of railroad troubles, which are remote from his personal interests, and little understood by those with whom he comes in contact.

This being the case, we see no reason to suppose that the large body of Congressmen who represent shippers rather than investors can be persuaded to make any change in the law. Even if they themselves should see the wisdom of such a course, it would be asking a great deal of them to sacrifice the apparent local interests of their constituents, as well as their own prospects of political advancement, for the sake of a matter on which public opinion, even of the more enlightened sort, is not fully agreed.

The failure of the Commissioners to recognize the necessity of a return to the pooling system means a great deal. If they think that the present state of things is the fault of the railroads rather than the law other people will think so too. We believe that they are mistaken as to this; but their mistake is itself a fact, and a fact of the highest political significance. When they say that the railroads should exercise better control over their agents, and that they might in this way refrain from destructive wars even under the present law, other people will surely say the same thing. It matters little for the present that we believe them to be wrong, as we did all along; or even that Mr. Sterne has changed his mind, and believes them to be wrong. The country will be governed by average public opinion on railroad matters, and that average is pretty certain not to be more enlightened, but much less enlightened, than that of the Inter-state Commerce Commissioners.

But for the future it matters a great deal whether they are right or wrong in their judgment. Public opinion can beat nearly everything except natural laws. But when it fights against those it is pretty sure to have the worst of it. Now, the fact that you cannot successfully stop discrimination and fluctuation without some sort of pooling arrangement has proved so universally true that it is fair to call it a natural law. The practices of the railroads which the Commission pronounces arbitrary and unjustifiable are almost forced upon them under the existing state of things. The Commission blames a railroad system for allowing its agents to meet cut rates. But as long as business goes to the road that makes the cut, we should like to see the Commission try to run a railroad on any other principle than the one they condemn. You cannot pursue a waiting or a conservative policy in this matter. If the road that makes the cut gets the whole competitive traffic, the increased volume of business will more than make up for the lower rates, while on the other hand the road which allows its business to be taken away will suffer more by the shrinkage in volume than it would lose by consenting to do the business at rates which the Inter-state Commerce Commission or any reasonable man that looked into the subject would consider to be absurdly low.

A competitive rate always tends to run down to the basis of operating expenses, and leaves little or nothing to pay fixed charges. If you have competi-

tive rates at all points, it means financial disaster. If you have them at some points and not at others, it means local discrimination. The short haul clause has prevented the latter result, but in so doing it has increased rather than diminished the danger of the former. The railroads have tried to avoid this danger by agreements as to rates. But such agreements, without special means of enforcing them, are not maintained either by railroads, or manufacturers, or any body else. The prohibition of pools has taken away the security for their maintenance. It has put the whole body of roads at the mercy of the most reckless among them. It has not merely forced them to meet a cut when one existed, but it made the suspicion of a cut as bad in its effects as the actual proof of one.

The chief merit of the pooling contract is that it removes such suspicions. It does not, as past history shows, prevent reductions in rates, although it may, under certain circumstances, prevent them from being so rapid as would otherwise be possible and desirable. It simply gives competing roads the assurance that their rivals will not be benefited by the ordinary, everyday irregularities of subordinate officials. If there is a pooling contract, such minor irregularities hurt the road that practices them more than they help it. Only by great looseness of policy and aggravated cases of bad faith, which are readily proved, can a railroad benefit itself by cutting rates under a pooling contract. This removal of suspicion produces an observance of the agreement, more faithful than could be obtained under any clearing house, however complete the detective system by which it should attempt to discover and avoid rebates. A clearing house is an excellent thing to facilitate the operations of a pool; and sometimes after people have become long accustomed to its workings, it renders a direct division of traffic unnecessary. Such has been the case in England where a clearing house and pools for a long time existed side by side, but where most of the latter have now become unnecessary. But this does not prove that England could have done without pools all along, nor does it indicate that we can do without them in the United States to-day.

We are not afraid of the contingency, which some persons so much apprehend, that legalized pools would involve a much larger measure of government interference than exists at present. In the first place, as we have already said, no pooling system is likely to prevent altogether the reduction of railroad rates. The advantage of doing an increased volume of business is of itself a guarantee that rates will be reduced from this motive alone. Each improvement in railroad economy makes this result more certain. The more permanence is given to a pooling contract, the greater is the reason to believe that the roads under it will adopt a far-sighted policy. If they do not do it of themselves, there are many outside influences and individual forms of competition to which even the strongest pool is subject. American producers are not the only ones who can supply the markets of the world. The through rates for wheat are largely determined by the competition of Russian and Indian shippers in the markets of Western Europe. No pooling system would seriously affect the potency of this cause. But should the railroads disregard their obligations in this matter, and pursue a short-sighted policy, the Commission has already assumed power enough in the various Northwestern wheat cases to enforce a reduction in rates under these circumstances. If pools were given the permanance which would be involved in their legal recognition, and if the publicity in details of such contracts were demanded, which would then be rendered possible, we believe that few occasions for the exercise of direct government authority would arise. But even when they did arise, there would be little reason to fear the arbitrary exercise of the rate making power. If it were in the hands of the Inter-state Commerce Commission, it would be used with moderation. If it were directly assumed by Congress or put in the hands of political schemers, the disastrous effects would be so clear and so obvious as to be only momentary. They would produce a reaction before they were fairly in operation. While we believe that the legalization of pools will be slow in coming, we see no reason to fear that it would be attended with dangers which would prevent its continuance.

Car Lighting.

Every enlightened railroad manager knows the commercial value of comfort for passengers; at least, he knows that it has a commercial value. But we are inclined to think that a disproportionate value is given to mere luxury, and not enough to comfort. There is one detail of great importance to the comfort of passengers in which the advance has not been at all proportionate to that made in more showy or luxurious details. We refer to the lighting of cars. With a few exceptions the passenger who now rides in the thoroughly comfortable and even elegant coaches of a limited train has as much difficulty in trying to read his paper by night as he used to have ten years ago.

We hear, of course, a great deal about cars lighted by electricity; yet the use of the electric light on trains is at least in its infancy, and it is probable that there are no cars so illuminated in this country in which the method has passed beyond the experimental stage considering the *cost*, as well as the results. At present a great majority of American cars are lighted, or not lighted, as the case may be, by clumsy and unornamental kerosene lamps hung from the roof, with all of their attendant objections of smoky and cracked chimneys and shades, evil smells, and the danger incident to carrying several gallons of inflammable oil in a place where it is sure to be scattered in case of wreck.

The reasons for this backwardness in car lighting are not hard to find, for the requirements of the service are exceedingly severe, and apparatus thoroughly capable of giving satisfaction for stationary service fails completely when subject to the peculiar conditions found upon a moving train. The space within the car is very small in proportion to the number of people it contains, and consequently it must be ventilated more perfectly, and far more rapidly, than a room. The smoke and heated air from the lamps must be carried through the roof, or the temperature in the car at once becomes oppressive. A short open ventilator, immediately connecting a lamp with the outside air which is blowing by at a rate of 40 or 50 miles an hour, is not conducive to a steady or brilliant flame. More than this, the doors of the car are frequently opened, causing a rush of air which would blow out an ordinary house lamp, and the windows and ventilators are constantly adding their quota to the atmospheric disturbances within the car. For these reasons it has been found almost impossible to develop a lamp which would give a thoroughly satisfactory light, and which would still stand for any length of time with its chimney unsmoked and unbroken.

It is true that gas is used with considerable success in this country, and very widely in Germany, and on the whole it is to-day the most satisfactory system of car lighting that is available; but there are certain objections which have stood in the way of its general use, and on account of the cost of compressing the gas and the limited supply which may at best be carried by a car, it is not used as freely in the car lamps as is necessary for good illumination, and so it is often true that gas lighted cars, while safer and cleaner than those lighted by oil, have really no better illumination; and many of the gas lit cars now running are less attractive to the passengers than are those using oil, for the burners do not give a flame even reasonably steady. If cars are to be satisfactorily lighted by gas they must have lamps which will give at once a very steady flame and a high degree of illumination in proportion to the amount of gas burned.

Many experiments have been made to adapt some one or another of the regenerative lamps to this service, but most of these attempts have been unsuccessful. These regenerative lamps all depend upon the general principle of using the waste heat to preheat the incoming air and gas, and thus get a flame of very high efficiency. From the very nature of their construction they are exceedingly sensitive to draft and disturbances, and are of necessity complicated, and in most cases difficult to light. Although they have served well enough for stationary purposes, they have been found altogether too unsteady for car service. But it is unquestionable that a regenerative lamp properly constructed will give foot for foot many times the light yielded by gas burned from an ordinary gas jet, and will produce an illumination much pleasanter and more brilliant.

One great bar to lighting cars by gas has always been the difficulty of carrying enough gas in cylinders under the car to supply them with a good light for a long journey. The cars had to be kept within daily reach of the gas works, thus forcing the roads either to light only special trains or multiply gas works. The introduction of a successful regenerative lamp would do away with this difficulty, by making it possible to supply a car with gas enough to serve a full equipment of such lamps for several nights.

English and American Railroad Economy.

In his last comparison of English and American railroads, presented to the American Society of Civil Engineers, Mr. Dorsey makes one new point of great importance. He compares the expense per ton-mile on the English roads, *omitting "traffic charges,"* with the *total* expense per ton-mile on certain American lines. He shows that the English roads on this basis do from 56 to 74 per cent. worse than the Pennsylvania, and what is still more surprising, from 32 to 47 per cent. worse than the Knoxville branch of the Louisville & Nashville.

The importance of this method of comparison lies in the fact that it practically excludes the English terminal charges from consideration. In fact, it does more than this; it excludes some charges which do not properly come under the head of terminal expense, and in which the density of traffic of English railroads should be an advantage rather than otherwise. If, after all these deductions, the cost per ton-mile on the English roads for motive power and repairs is higher than the total cost per ton-mile on the American roads, it shows that the English practice must be wanting in some essential elements of economy.

There are two points in which some part of Mr. Dorsey's reasoning is open to possible criticism. The first is the assumption that the percentage of expenses to earnings is the same in freight and passenger business. In the United States this would be a very serious error; in England, if we may judge by the practice of English statisticians, it is probably correct enough for practical purposes. The other point is a more troublesome one. It relates to the accuracy of the whole set of English ton-mileage and train-load figures used by Mr. Dorsey. We need hardly remind our readers that such figures are not directly given in the English returns. They are the result of an estimate obtained by dividing the total freight receipts by an assumed ton-mile rate of one penny. We are not satisfied that this assumed rate is low enough. It may be so; but it is not safe to work on this assumption. If the average charge on minerals is only ¾ of one penny per ton, as assumed by Mr. Dorsey on page 17 of his original paper, and minerals furnished (as they do) much more than two-thirds of the total tonnage, it would require an average merchandise rate of decidedly over 1¼ pence per ton mile to make Mr. Dorsey's general figure correct. But the best estimates do not make the general merchandise figure higher than 1¼ pence at the outside. This would barely give one penny per mile per ton of 2,240 pounds, or 0.9 pence per American ton of 2,000 pounds. And this with a considerable margin of possible error, we believe to be about the correct figure, though we are disposed to place the mineral rate somewhat higher, and the general merchandise rate somewhat lower than in the estimates just given.

But this correction does not destroy the force of Mr. Dorsey's comparisons. The margin of difference in economy between American and English railroads, as shown in his computations, is so great as to be but slightly affected by a change of ten per cent. Even on the assumed average haul of 37 miles claimed by the severest of Mr. Dorsey's English critics (see *Railroad Gazette*, Oct. 7, 1887), corresponding to an average rate of about 0.81 pence per ton of 2,000 pounds, the comparison would be distinctly in favor of the American practice.

We trust that some English statistics may be published before many years in a form which will admit of a surer basis for all these comparisons.

Scalpers and Rate Cutting.

The general manager of one of the Chicago-Missouri River roads is quoted as saying (last week) that the Inter-state law, so far as it concerns publicity of rates and the ten-day limit of notice to be given when an advance is made, is a dead letter. Speaking of the rate-cutting in that territory, he says:

"The disastrous cut in passenger rates is due to the action of the Santa Fe & Burlington in placing large blocks of tickets in the hands of the scalpers. The scalpers get these tickets for about $6, and can afford to cut and reduce to a very low figure. It was the outcome of the attempt of the Santa Fe to advertise its Eastern line. There are many thousands of dollars' worth of tickets in the hands of the scalpers. The Santa Fe road is nearly bankrupt, and all the other Western roads will go the same way if something does not turn up."

A law is a dead letter when no attempt is made to enforce it. The question whether it can be enforced or not does not affect its deadness for the time. The facts reported would seem to justify the general manager's view, as matters have stood up to the present time; but the selling of tickets in large numbers direct to outside speculators has not been persistently charged against any road since the advent of the Inter-state Commerce law until quite recently, and it is not by any means certain that the Commission cannot stop or greatly check the evil. Chairman Cooley and Commissioner Morrison have been in Chicago this week making "inquiry on their own

motion" concerning various practices there, and it seems that this business is one of the chief topics receiving their atttention. The hearings were not public, but the telegraphic accounts which we note in another column seem reasonable, and we doubt not the reporters have got pretty near the truth.

If a broker, or any one else, has in possession a large number of tickets of a single form, that fact is strong presumptive evidence that he has bought the tickets to sell again. The only way, under present laws, to prove even that the broker has the tickets is to go and buy them of him; and after accomplishing that much it will still be hard to prove how much he paid for them. It is said that a prominent broker was before the Commissioners at Chicago last week, and was threatened with arrest for contempt because he would not tell what road furnished him with tickets or the prices and conditions on which he obtained them. Unless the officers of the railroads can be made to disclose their methods, further legislation would seem to be necessary to cover the case. The Commission has undoubted power to compel the roads to tell the prices at which they sell any and all tickets and, as well, what they pay out in the way of commissions, salaries or anything else. It already requires this annually; what obstacles might be encountered in getting at details cannot be predicted. It would seem that an understanding with all honorable officers ought to be reached without great trouble, provided the Commissioners can find time to examine into all cases. But men who will knowingly discriminate by paying exorbitant icing charges, hiring shippers' clerks as "employés" and such like tricks, can be expected to be willing and able to resist the law in other directions.

Selling a block of tickets, say 50 or 100, to a single purchaser without asking any questions is prima facie evidence of intent to make that purchaser an agent of the company. And if he is an agent, the private rate cutting at once becomes a crime. If he is not an agent, then, in the language of the Commission, what becomes of the law against discrimination? The figures given in the Commission's annual report go to confirm the general impression that very large sums are paid out for commissions, and all conservative and temperate managers must welcome the action of Chairman Cooley and join in the hope that he will get at the facts and find a remedy for them. For a general manager to report gross receipts only after deducting such large expenditures is a gross imposition upon the stockholders. At the same time the receipts per passenger mile are, of course, also shown too small, and thus a false idea given to the general public and to all interested in the road, either as owners or patrons. When, as in the case of the Erie as just shown in its annual report, the competitive business on which the largest commissions are paid is shown to be a very small part of the total passenger traffic, the absurdly wrong face put upon the returns becomes extreme.

It is reported that the Chicago roads at once acted on Chairman Cooley's wholesome advice and that rates were ordered restored in ten days, but there is no indication of a restoration of the low rates from St. Paul eastward and southward, which had become open and public though begun through the brokers' offices.

We received too late for publication last week the following abstract of the proceedings at the meeting of the incorporators of the Engineers' Club, which was held Dec. 4, although the result of the meeting was given: "On Tuesday evening, Dec. 4, a number of gentlemen interested in the formation of a social club whose object is to draw more closely together those engaged in the kindred pursuits, met at the rooms of the American Society of Civil Engineers, in this city. The organization was perfected, the incorporators being: James A. Burden, H. R. Towne, J. C. Bayles, A. C. Rand, David Williams, B. S. Church, Edward Cooper, Thos. Egleston, W. G. Hamilton, J. F. Holloway, W. A. Perry, J. C. Pratt, R. W. Raymond and F. S. Witherbee. Its present officers are: James A. Burden, President; H. R. Towne and James C. Bayles, Vice-Presidents; A. C. Rand, Treasurer, and David Williams, Secretary. The responses received at an earlier stage of the movement encourage the belief that the new club will start with a large and representative membership. A circular is soon to be issued to members of the three great engineering societies inviting their co-operation and placing before them the details. Engineers residing within 150 miles of New York are eligible to membership, the initiation fee being $50, and the annual dues $35. For non-resident members the admission fee is $50, and the annual dues $20." Any person eligible to membership in the American Society of Civil Engineers, the American Institute of Mining Engineers or the American Society of Mechanical Engineers may become a member of this club. A Committee on Admissions, of ten, is provided for, to pass upon candidates for membership. After examination of the qualification of candidates, the Committee may report the names of persons recommended for admission for ballot at any monthly meeting of the club. Five negative votes are to exclude, and no person so excluded is to be eligible for twelve months thereafter. The membership is limited to 1,000, exclusive of those exempted from payment of dues. This, it should be understood, is a social club, and intended in no way to accomplish the objects of the societies which now exist. In fact, it should further them rather than interfere with them. If the club is successful, and there is little reason to doubt that it will be, it will bring into closer and more frequent intercourse a very interesting class of men, and is as likely to increase as to diminish the attendance at the stated meetings of the various societies.

The Lake Ore Trade of 1888.

The shipments of iron ore from the Lake Superior mines for this year have, to date exceeded those of 1887 by 5 per cent., or by 210,577 tons, an excess over 1886 of 1,107,248 tons. A very decided reduction in the amount of ore shipped was expected in the spring, as the amount of ore on the docks of Lake Erie ports at the commencement of navigation was 703,720 tons (at present there are but 167,300), but the demand has increased steadily, and the Marquette *Mining Journal* estimates the total shipments by rail and lake at 5,000,000 tons.

The shipments by ports for the two past years have been:

Port.	1888.	1887.
Marquette	844,694	803,411
Escanaba	2,181,452	2,072,708
St. Ignace	107,390	91,544
Ashland, Wis	1,016,414	1,040,727
Two Harbors	450,475	390,467
	4,600,454	4,398,857

And by ranges the shipments have been:

Range.	1888.	1887.
Menominee	1,111,220	1,154,110
Marquette	1,815,402	1,755,328
Gogebic	1,223,334	1,081,872
Vermillion	433,607	302,081
	4,583,563	4,293,391

All the ore shipped except 634,000 tons has gone to Lake Erie ports, and there has been a decided change in the distribution of iron ore by ports on this lake, as is shown by the following table from the *Iron Trade Review*:

Port.	1883.	1884.	1885.	1886.	1887.	1888.
Toledo	27,617	2,444	15,000	26,960	61,729	75,601
Sandusky	58,825	106,540	143,180	157,970	160,600	154,924
Huron	.....	.....	.....	44,021	21,288	4,351
Lorain	25,794	30,156	13,180	99,744	134,764	197,000
Cleveland	723,129	904,850	589,234	1,034,650	1,216,423	971,795
Fairport	40,334	23,100	31,992	112,000	501,368	611,140
Ashtabula	670,000	650,000	582,000	672,000	1,103,839	1,288,530
Erie	106,787	116,027	122,223	91,250	210,488	240,338
Buffalo	40,203	8,760	7,160	31,869	28,699	240,000
Total	1,692,689	1,841,877	1,503,969	2,270,554	3,439,198	3,783,659

It will be noticed that Ashtabula this year for the first time takes the lead as an ore receiving port and that Buffalo makes an increase in its receipts of 210,000 tons, or about 700 per cent., due to increased shipments of Lake Superior ores to Eastern furnaces where they are displacing foreign ores.

As about $16,000,000 was distributed last year in mining and transporting the ore mined in the Lake Superior region, and probably about an equal amount this year, any forecast as to the continuance of this expenditure in its present locality is of interest. It is probable that fully 7,000,000 tons of ore could be mined next year if the demand and transportation permitted it, and with these limitations an estimate of 6,000,000 tons will probably not be found much larger than the actual output for 1889, unless some unforeseen disturbance of trade occurs. The production of iron in this country may be less this year than last, as there was a decline which commenced in 1883 and culminated in 1885. But there was no decline in shipments through the St. Mary's Falls Canal, except during one year, as will be seen from the table showing the shipments of iron ore by that route, and our make of pig iron, both in gross tons, from 1880:

	Iron ore through canal.	Pig iron.
1880	677,073	3,835,191
1881	748.131	4,144,254
1882	987,060	4,623,323
1883	791,732	4,595,510
1884	1,136,071	4,097,868
1885	1,235,132	4,044,526
1886	2,087,809	5,683,329
1887	2,497,713	6,417,184

It will be seen that though for 1882–85 there was a decrease in our make of pig of 587,800 tons, the shipments of ore through the canals increased during that time by 257,000 tons, 1883 being the only year in which there was not an increase, and it is doubtful if the production of ore on Lake Superior will be seriously restricted for several years.

In view of the fact that considerable has been said lately about the time made by some of the fast trains of Eastern lines, it may be interesting to know what is being done on Western roads. Nov. 20, the fast mail on the Chicago, Burlington & Quincy, leaving Chicago at 3 a. m., arrived at Galva 55 minutes late, on account of running hot on one of the engine truck bearings. It could not be cooled and finally at Galva the engine was cut off and a freight engine (No. 339, Class A, 17 × 24, built at Baldwin's, September, 1879) and a freight engineer took the train, bringing it to Galesburg, 23½ miles, in 29 minutes. At 8:05 a. m. (48 minutes late), engine No. 153 (standard Class A engine, 18 × 24), left Galesburg with the delayed train, composed of three six-wheeled mail cars, 60 ft. long, of 18 tons capacity each, and fully loaded. The train arrived at Burlington, 43.3 miles distant, at 8:58 a. m., making the run, including stops, in 53 minutes, or a rate of 49 miles per hour. The train left Burlington at 9:05 a. m., 30 minutes late, arriving at Ottumwa on time, at 10:40 a. m., making the run from Burlington, 75.2 miles, in 1 hour and 35 minutes, including all stops, or an average of 47½ miles per hour. The train struck its time at Batavia, 13 miles east of Ottumwa station, so that had it been required from Batavia the average speed could have been further increased. It will be seen, therefore, that the run as it stands from Galesburg to Ottumwa, 118.5 miles, including all stops, was made in 2 hours and 35 minutes, an average of 45⅞ miles per hour. Let us deduct from the run the time that the following stops would represent:

First—Central Iowa crossing at Monmouth, full stop, estimated	1 min.
Second—Monmouth Station, regular stop, transferring mail, full stop, estimated	4 "
Third—Carthage Junction, slackening, estimated	1 "
Fourth—Burlington Draw Bridge, full stop, estimated	1 "
Fifth—Burlington Depot, regular stop, full stop, actual	7 "
Sixth—New London, for water, full stop, estimated	4 "
Seventh—Mount Pleasant, regular stop, full stop, estimated	3 "
Eighth—Fairfield, regular stop, full stop, estimated	3 "
Ninth—C., R. I. & P. crossing between E. and W. Ottumwa, full stop, estimated	1 "
Total	25 min.

Thus the average speed between Galesburg and Burlington was 43.3 miles in 46 minutes, or 56.48 miles per hour. Between Burlington and Ottumwa, 75.2 miles, it was 77 minutes, or 59 miles per hour. The whole distance between Galesburg and Ottumwa, exclusive of stops, 118.5 miles, was run in 123 minutes, or 57.8 miles per hour. The time lost in slackening and starting at stopping places not being taken into account, the actual running speed must frequently have been up to 70 miles per hour for short stretches.

A highway crossing accident which took place at Paterson, N. J., last Saturday illustrates precisely the point of which we spoke last week, that every gate which is watched a part of the day and is left at the safety position, unwatched, the rest of the 24 hours, presents a peculiar danger. The open gate is an invitation to passers to cross the track without taking the pains to "look and listen" that they would take were there no gate. In this particular case the gate is left open during the night, and the watchman goes on duty at 6 a. m. At 5:30 a. m. three men in a covered milk wagon drove through the open gate on to the track. Two were instantly killed and the third dangerously wounded. We may repeat here the statement of the Massachusetts commissioners that nearly one-half of the accidents happening at highway crossings in one year were at crossings provided with gates or flagmen. In 1887, 36 per cent. of the accidents at crossings were at "protected" crossings, and 36 per cent. of all crossings were "protected." Of course the crossings protected by gates or watchmen are much more used than those not protected, and therefore the comparison made above gives no measure of the value of the protection.

It must be a matter of judgment in any given case as to which crossings should be provided with watchmen at all hours, and which may be left unguarded some part of the day; but for the latter class, automatic bells and conspicuous signs explaining the fact that the gates are unattended part of the 24 hours will give additional security.

The Railroad Commissioners of Kansas, in a recent decision, on a complaint entered by citizens of Duck Creek Township against the Atchison, Topeka & Santa Fe, laid down principles which would seem to be self evident, though the existence of the complaint is evidence to the contrary. The town voted aid to the Chicago, Kansas & Western to the amount of $15,000 on condition that a depot should be erected. The building was put up and an agent maintained for some time, but as the receipts fell off—the total revenue for the year ending Oct. 1 last amounting to a little less than $1,200—the agent was withdrawn. The nearest regular stations are Fredonia and Longton, which are 19 miles apart. As the obligation to pay interest on the bonds voted in aid of the road is a direct burden of about $1,000 upon the town, the Commissioners very justly decide that the road has no right to deprive the people of full station facilities. Even if the town had given no aid to the road it is questionable if the discontinuance of this station would have been justifiable. The Board suggests that it may not be necessary to maintain a full salaried agent.

Last week, in a description of the vestibuled trains lately put in service for the fast run to San Francisco, known as the "Golden Gate special," we stated that the trains are heated by the Sewall system. The statement was made on the authority of a correspondent usually trustworthy. We are now informed that the Golden Gate special was fitted with the McElroy steam heating system and the Sewall coupling.

TRADE CATALOGUES.

The Westinghouse Electric Co.: Illustrated Catalogue. This is the season of the year when we naturally expect the publishing trade to place upon the market volumes enriched with the choicest examples of artistic elegance and mechanical skill. The development of electricity, its wonderful resources, the ingenious instruments by which it is applied for the convenience and comfort of the public, have afforded an opportunity, however, for this enterprising manufacturing company to prepare for gratuitous distribution one of the most elegant trade publications which has come to our notice. The Westinghouse concerns has issued many fine catalogues, but this is, perhaps, the finest of the series. But it is not alone the beauty of the engravings,

the press work, or the ornamentation of the Lincrusta-Walton covers in which it is inclosed which has attracted our admiration. We have found within its pages a most simple and beautiful explanation of the action of the electric current, couched in language so clear, and presented so attractively, that any person at all familiar with mechanism may thoroughly comprehend what he has supposed to be the "mysteries" of alternating and continuous systems, dynamos and motors, and the other paraphernalia of electric lighting. Those who desire to familiarize themselves with the various methods by which electricity is applied for lighting purposes, cannot fail to be instructed by the perusal of this book, which treats with equal exactness the advantages of the continuous system or the merits of the alternating. Separate chapters are devoted to interior and street lighting by incandescent lamps, as well as to the various instruments used in all branches of the business. The "bits of experience," which form the concluding chapter of the text, are valuable to those who contemplate introducing electric lighting of any description.

TECHNICAL.

Locomotive Building.

The Duluth, South Shore & Atlantic has received from the Baldwin Locomotive Works the remaining 6 of its order for 15 freight locomotives.

The Manchester Locomotive Works of Manchester, N. H., are engaged on an order for locomotives for the Atchinson, Topeka & Santa Fe.

The new buildings of the Cooke Locomotive Works at Paterson, N. J. are fast approaching completion. The contract price of the buildings is about $100,000, and including the land and machinery the cost will be nearly $500,000.

Car Notes.

Of the 700 cars which the Cleveland, Columbus, Cincinnati & Indianapolis will soon contract for, 200 will be coal and 500 box cars instead of all being box cars as was stated last week. They are to be delivered early next year.

The Barney & Smith Manufacturing Co., of Dayton, O., has completed the first lot of the express cars building for Wells, Fargo & Co., for use on the New York, Lake Erie & Western.

The Central of New Jersey has asked for bids for building 25 passenger coaches and 250 box cars.

The St. Charles Car Co., of St. Charles, Mo., has just received an order from the Union Pacific for 15 chair cars and two suburban coaches.

Bids have been received by the Pittsburgh, Cincinnati & St. Louis and the Chicago, St. Louis & Pittsburgh for building 2,000 freight cars, 1,000 box, 500 stock and 500 gondola cars, all to be equipped with the Janney coupler, and all but the gondola cars with the Westinghouse air brake. The Pennsylvania road proper has just placed an order for 2,500 box cars, to be equipped in the same manner. In future all freight cars of the Pennsylvania Co.'s lines will be equipped with the automatic couplers, M. C. B. type, and all stock and box cars with air brakes.

Eight new postal cars are being built at the Altoona shops of the Pennsylvania.

Bridge Notes.

The Canadian Government has granted the Canada Atlantic Co. the power to bridge the St. Lawrence River at Coteau, Que. This will complete a through line to Boston and New York from Ottawa. The total length of the bridge, including abutments, will be 405 ft.

W. J. Winn, City Engineer, of Savannah, Ga., will soon advertise for bids for the construction of an iron highway bridge to be built over the Savannah and Ogechu Canal.

A bridge company has just been organized at Belleville, Can., and proposals for the construction of an iron bridge will soon be asked for.

The following proposals for the abutments of the West Main street bridge at Rochester, N. Y., were opened: Weider & McMahon, $8,378; James Robinson, $8,724; Charles Brown, of Mohawk, $9,608; B. P. Smith, of Rochester, $10,216; W. Fuller, $10,345; George Chambers, $11,252. The contract was awarded to Weider & McMahon.

An iron bridge is to be erected at Oneonta, N. Y.

A bridge over Sanqueen River, at Southampton, Ont., is to be begun in spring.

Proposals are wanted until Dec. 24 for building a wrought iron bridge over the Erie Canal at Troy, N. Y., by Col. J. M. Whittemore.

Bids are wanted until Dec. 21 for the construction of the Dundas street bridges at Toronto, Can., both masonry and steel superstructure. Address Chairman Committee on Works.

The contract for the superstructure on the North Ferry street bridge, in Albany, N. Y., has been awarded to the Hilton Bridge Co.

An application will probably be made to the next New Jersey Legislature for a charter to build a bridge over Staten Island Sound, reaching from Westfield, in Staten Island, to Perth Amboy, in New Jersey. The capital required will be at least $1,000,000.

The Board of Army Engineers, which was appointed a Special Harbor Commission for Boston, has caused an order to be issued to the Fitchburg Railroad Co. by the War Department, to the effect that the bridge over the Charles River belonging to that road must be rebuilt. The reasons given were that the bridge as now built is too low; has too short spans and the draws are too narrow. The building must be replaced within two years from next January. All the railroads having bridges across the Charles River are likely to receive a similar order.

The Snohomish Bridge on the Seattle & West Coast, the north branch of the Seattle, Lake Shore & Eastern Railway, is nearly rebuilt, after the wreck in the recent river flood.

The Pittsburgh Bridge Company has been awarded the contract to build an iron bridge, 272 ft. long, across Island Creek, near Paducah, Ky.

The new railroad bridge over the Ohio River, at Cincinnati, being built by the Phœnix Bridge Co. for the "Huntington System" (to connect the Chesapeake & Ohio Railroad with the city of Cincinnati and the Cincinnati, Indianapolis, St. Louis & Chicago road), is to be completed so that trains can cross Jan. 1.

The new Central Viaduct, an iron structure about 110 ft. high and 4,000 ft. in length, connecting the South Side suburb with the business portion of Cleveland, Ohio, was dedicated this week. It was built by the King Iron Bridge Manufacturing Co.

Manufacturing and Business.

The New York & New England road is using the Littlefield steel brake beam manufactured by the Burton Stock Car Co., of Boston.

It is stated that the New York, Lake Erie & Western will close the foundry and forge departments of the shops at Susquehanna, Pa., and let out that kind of work to contractors at Buffalo and elsewhere.

The Denver & Rio Grande has closed a contract with the Standard Switch Co., of Topeka, Kan., under which it adopts the Robinson connecting rod as standard on all its lines. This rod was illustrated in the *Railroad Gazette*, Sept. 21, 1888. It has no bolts, nuts, cotters or other loose parts at either end, and cannot be maliciously displaced without a good deal of trouble. It is standard on all lines of the Santa Fe.

A. Whitney & Sons, of Philadelphia, have contracts for about 7,000 wheels for new cars. They are also doing a large business in small wheels for mining purposes and are sending them to Alabama and other parts.

The Shiffler Bridge Works, of Pittsburgh, Pa., has just completed for the Pennsylvania an additional passenger train shed at the Union Station in that city. It is 508 ft. long and 106 ft. wide.

Messrs. Byram & Co., of Detroit, Mich., exclusive manufacturers of the Colliau cupola furnace, have recently placed four of their large size Colliau cupolas in the new shops of the United States Rolling Stock Co., at Anniston, Ala., and besides other orders have a contract with the C. A. Treat Car Wheel Works for two large size Colliau cupolas for the new plant being erected near East Chicago, Ind.

The Barr Pumping Engine Co. is building hydraulic pressure pumps of the following dimensions for the firms named below: One 26 × 9 × 36 for Jones & Laughlin, of Pittsburgh, Pa.; one 18 × 5½ × 18 for N. J. Warden, of Philadelphia, Pa. The company has lately enlarged its plant to meet the growing demand and has also established a branch office at 35 Fifth avenue, Chicago, with Raze & Davis as managers.

The Dunham Manufacturing Co., of Boston and Chicago, will hereafter be the exclusive selling agents for the railroad trade of the well known Globe ventilators, manufactured by the Globe Ventilator Co., of Troy, N. Y.

Tinius Olsen & Co., of 500 North Twelfth street, Philadelphia, Pa., have made several 200,000-lb. testing-machines this year, among which may be mentioned one for the Chicago & Northwestern, one for Carnegie, Phipps & Co., of Pittsburgh; a similar one for Henry Warden, of Philadelphia; a 100,000-lb. machine for the Cleveland Rolling Mill Co., of Cleveland, O.; a 50,000-lb. machine for the Paxson Rolling Mills, of Harrisburg, Pa. They have just finished an order for eight of their machines for the Government Inspectors of Marine Boilers, and have also made large 60,000-lb. spring testers for the French Elliptic Spring Co., of Pittsburgh; also a similar machine for the Shiven Spring Manufacturing Co. and the Charter Scott Spring Co., of Philadelphia. They are also building a 200,000-lb. tester for Jones & Laughlins, of Pittsburgh, and another special testing machine for H. W. Williams, of Brooklyn, N. Y.

The Batt & Hager Safety Switch Co., of Buffalo, N.Y., recently incorporated with a capital stock of $200.000. have chosen the following officers: President, Leonard B. Crocker; Vice-President, Charles G. Paukow; Secretary, Paul Werner; Treasurer, Henry Baethig; Railroad Agent, A. W. Bishop. This switch is in operation on the Delaware, Lackawanna & Western, the New York Central and Lake Shore & Michigan Southern roads, and Western roads are making arrangements for its introduction.

Warren Webster & Co., proprietors of Webster's "Vacuum" feed-water heater and purifier, of Philadelphia, Pa., have recently received many orders for their vacuum feed-water heater and purifier of from 40 to 1,000 H. P. capacity, the largest being an order from the Pencoyd Iron Works, Pencoyd, Pa., for two 1,000 H. P.

The plans for the stations of the new Raritan River road, to be built at New Brunswick, Sayreville, Milltown and Washington, N. J., furnished by G. E. Harding & Co., have been accepted, and the contracts for their erection will be let within a few days. They are to be built of buff brick with red and blue slate roofs.

Orders for the Newton steam trap for the following firms have been recently filled by the Providence Steam Trap Co., Providence, R. I.; Washburn & Moen Mfg. Co., Worcester, Mass.; Holmes, Booth & Haydens, Waterbury, Conn.; Middleton Electric Light Co., Middleton, Conn.; Rhode Island Locomotive Works, Providence, R. I.; Hopedale Machine Co., Hopedale, Mass.; Amory Mfg. Co., Manchester, N. H.; Union Steam & Gas Pipe Co., Pawtucket, R. I.; M. M. Rhodes & Sons Co., Taunton, Mass., and Providence Steam and Gas Pipe Co., Providence, R. I.

The Louisville, New Albany & Chicago road is equipping all of its freight locomotives with the American steam driver brake.

The Consumers' Water Co., of Atlantic City, N. J., has closed a contract with the Smith & Vaile Co., of Dayton, O., for duplex steam pumps and boilers. The pumps are to be of a daily capacity of 3,000,000 gallons.

The Haines, Jones & Cadbury Co. has succeeded to the plumbing and steam fitters' supply business of the late firm of Haines, Jones & Cadbury, 1136 Ridge avenue, Philadelphia.

The New York Belting & Packing Co., manufacturers of vulcanized rubber belting, packing and hose, has opened a branch house at 17 and 19 Main street, San Francisco, Cal.

The Pennsylvania has completed the electric lighting system at the large new shops at Pavonia, N. J. The night system embraces 75 lights, with 450 additional incandescent lights for the working hours when necessary.

Iron and Steel.

The 24-in. mill department of the National Tube Works Co. at McKeesport, Pa., has closed down for the winter, and men employed there will be transferred to other departments of the plant.

The Swindell Construction Co., of Pittsburgh, has nearly completed the remodeling of the tube department of the Riverside Iron Works, of Wheeling, W. Va.

The Andrews Brothers Company, of Youngstown, Ohio, is building four new double-puddling furnaces.

Furnace No. 2 of the Ensley plant at Ensley City, Ala., went into blast last week. Each of the three furnaces now in active operation produces 150 tons daily. The last furnace of the plant will go into operation Feb. 1.

The Edgar Thomson Steel Works Co. has had drawn plans and specifications for the erection of a new foundry and machine shop at Braddock, Pa., to make all its own castings, molds, etc., for the blast furnaces, which work has heretofore been done by outside firms. A 15-ft boring mill has been ordered for the machine shop. Work will shortly be completed remodeling the old rail mill to convert it into a department for the manufacture of steel billets and blooms of sizes ranging from 11 in. upwards. The old roughing rolls will be utilized, but new finishing rolls, an invention of General Manager W. R. Jones, which are more rapid in movement than the old style rolls, will also be used. The old rail mill has been idle since the operation of the present mill with a capacity of 1,500 tons per day was begun.

The Allegheny Bessemer Steel Co., of Pittsburgh, has appointed B. B. Kerr Western agent for the sale of steel rails, with office for the present at 243 Lake street, Chinago.

The Chicago Crucible Steel Casting Co. has established offices at 156 Lake street, Chicago.

Lean & Blair, of Pittsburgh, have closed a contract with the Union Rolling Mill Co., of Cleveland, O., for remodeling the company's blast furnace plant, including the erection of two Ford & Moncur hot blast stoves, which are to blow a furnace of 200 tons daily capacity. It is claimed that the blast for two large modern blast furnaces can be heated with three of these stoves and kept at an even temperature throughout the blow.

The new lap-weld furnace in the pipe mill of the Riverside Iron Works, at Wheeling, W. Va., is almost completed and will be fired up in a few days.

The National Tube Works Co., of McKeesport, Pa., has purchased the plant of the Cartwright Iron & Steel Co., near Steubenville, Ohio, and will use the plant for manufacturing muck iron. The company will put in a new mill and six double puddling furnaces in addition, making the daily capacity 60 tons.

J. W. Witherow & Co. will enlarge their plant at New Castle, Pa. Work has just been commenced on an addition to the machine shop which will cost $45,000. One of the largest traveling cranes in this country has just been received at the works. It was made by W. Sellers & Co., of Philadelphia.

B. L. Keen & Co., manufacturers' agents for the sale of bar iron, steel, railroad supplies, etc., have removed from 184 Lake street to Room 545, Rookery Building, Chicago.

Wm. Swindell & Bros., engineers and builders of regenerative gas furnaces, of Pittsburgh, Pa., are erecting a large Siemens gas furnace for the Moorhead-McCleane Co., of the Soho Iron & Steel Works.

The new tube mill of the Reading Iron Works, in Reading, Pa., was shut down last week for an indefinite period. The firm's other tube mill is running full handed.

A. H. Danforth has resigned from the position of General Manager of the Colorado Coal and Iron Co., Pueblo, and S. H. Dupuy, of New York, has been appointed to fill the vacancy.

The Fort Worth & Rio Grande has contracted with the Joliet Steel Co. for 5000 tons of steel rail, and with the Edgar Thomson Steel Works for 5000 tons.

The Rail Market.

Steel Rails.—Sales aggregating 8,000 tons have been made by Eastern mills at private terms. In the West contracts for 20,000 tons for a Northwestern road have been placed, and 14,000 tons for Kentucky and Colorado roads. In the East it is probable that $28 is underbid, and that orders have been placed at $27.50, and Pittsburgh quotations are $26.50. These figures are an advance of $1@$2.50 a ton over those quoted not long since, and a further rise may be made. The North Chicago Rolling Mill Co. has secured an order from the Union Pacific for 17,000 tons at a price said to be between $27 and $27.50.

Old Rails.—Quotations are $23.25@$23.50 for tees, with no large sales.

Car Heating Notes.

The Detroit, Lansing & Northern is equipping a large number of its cars with the Martin system.

The Western, New York & Pennsylvania has adopted the Gold system.

Automatic Time Signals.

The Barry automatic train indicator, an instrument with a clock face, for indicating to engineers the number of minutes that have elapsed since the passage of the preceding train, and which was described in the *Railroad Gazette* of July 27, page 488, is now being tried on the Delaware, Lackawanna & Western, Boston & Maine and New York Central & Hudson River. The Fall Brook Coal Co., which has used these instruments for some time, now has 15 of them in operation. They give excellent satisfaction.

Johnson's automatic railway time signal, an apparatus designed for the same purpose as the above, is now being tried on the New York Central & Hudson River. A dozen of these instruments have for a year or two been in use on the Eastern Division of the Boston & Maine and a similar number on the Boston & Lowell. This instrument consists of a perpendicular glass tube, about 2 in. in diameter, mounted upon a graduated scale like a thermometer. The apparatus is placed upon a post at the side of the track. On the passage of a train a track instrument actuates a diaphragm pump, which fills the tube with colored (red) alcohol from a reservoir at its base. After the passage of a train the alcohol in the tube runs slowly back to the reservoir through a small orifice, the diameter of which is adjustable. The height of the column of liquid as shown by the figures on the graduated scale, therefore, indicates the number of minutes which have elapsed since the passage of a train. The outlet may be adjusted so that the emptying of the tube will consume either five or ten minutes, or a longer time. The scale of figures showing the minutes may, therefore, be either large or small, as desired.

Bridge Notes on the New York Central & Hudson River.

The following lettings have been made: One Hundred and Sixty-fifth street bridge, New York city, 160 tons of steel, with brick arch floor; and two plate girder bridges of 92 ft. and 50 ft. span respectively, all to the Hilton Bridge Co. It has been decided to replace the McCombs Dam draw-bridge, near New York city, by a double-track steel plate swing bridge, 100 ft. long, with solid plate floor and stone ballast. The estimated cost is $25.000. This winter a new bridge will be built over the Erie Canal, at Rome, N. Y., 90 ft. span, double track, two trusses. Thomson's plate floor will be used with broken stone ballast. The bridge will weigh 3,300 lbs. per lineal foot—open-hearth steel; estimated cost, $15,000. The bridge taken out has been in service over 25 years, and is replaced because it is too light for the present traffic.

Ship Building on the Lakes.

The Cleveland *Plain Dealer* publishes a table showing that 59 new boats, measuring 100,950 gross tons, valued at $7,124,000, will be put afloat on the lakes between now and the middle of next summer. The *Railroad Gazette* of Dec. 2, 1887, gives the number of vessels built during that year as 53, with a net tonnage of 63,732 tons, valued at $5,817,000. Of these 43 were wooden steam, 4 wooden sail, 5 steel steam

and 1 composite steam. This year 9 steel propellers, with 22,800 tons gross, valued at $2,070,000, or a little over $90 per ton are building, and one steel passenger steam of 750 tons, valued at $350,000. Four composite propellers of 2,500 tons each, valued at $720,000, or $72 per ton. Thirty-five wooden propellers measuring 60,200 tons, valued at $3,617,000, or $61 per ton, and five schooners of 7,000 tons in the aggregate, valued at $235,000, or $33.60 per ton. The balance are small side wheel and propeller passenger boats. The above does not include the large steel ferry-boat built for the Michigan Central Railroad to carry 24 loaded freight cars through ice 2 ft. thick and costing $325,000. The ownership of these new boats is very well distributed. Ten are for sale and four on account of builders; no other parties or corporations seem to own over two. Six of the steam propellers are being built by the Globe Co., of Cleveland, two by the Cleveland Ship Building Co. and one by the Union Dry Dock Co., of Buffalo. The 750-ton steel steamer is being built by the Detroit Dry Dock Co. Thirteen vessels are building at Cleveland, 8 at Detroit, 13 at West Bay City, 6 at Marine City, and the rest at various points where three or less are building. It is rather remarkable that only two, one steel and one wood, are being built at Buffalo and none at Chicago, a city which makes so much steel and seems to offer special advantages for marine construction.

It is asserted that the lake marine averaged profits of about 33 per cent. in 1887, and though the first part of this season was not particularly profitable, the gains for this year will probably be near 25 per cent., and there is now every prospect that the building of large freight carriers will be prosecuted with increased rather than diminished energy; but until there is some possibility of getting these vessels to sea in case of a series of dull seasons, the fear of a glut of freight carriers will generally keep their number below the requirements of the traffic, and the average profits on this class of property will probably average much above that gained in other investments.

The Fast Trains to Edinburgh.

A recent number of the *Engineer* contains some details of trips made by the east coast flying expresses which were run last summer between York and Edinburgh by the Northeastern Co. The distance from York to Newcastle is 80½ miles, the time allowed was 93 minutes—the average time occupied on the journey was 86.2 minutes; the average detention per trip, by signals, etc., was 2.6 minutes, so that the average actual running time was 83.6 minutes, and the average actual time gained in running each trip was 9.4 minutes; the quickest actual run was 78 minutes for the trip, or an average speed of 62 miles per hour throughout the journey from York to Newcastle. This trip was done by an ordinary express engine, having cylinders 18 in. × 24 in., with coupled wheels 7 ft. diameter. The distance from Newcastle to Edinburgh is 124½ miles, the time allowed was 152 minutes; the number of vehicles was the same as the other section, viz., seven. The average time occupied upon the journey was 141.7 minutes, the average detention per trip, by signals, etc., was two minutes, so that the average actual running time was 139.7 minutes, and the average actual time gained per trip in running, 12.3 minutes. The quickest run was made in 125 minutes, or an average speed of 59.56 miles per hour throughout the journey from Newcastle to Edinburgh. This trip was run by a compound engine with cylinders, high-pressure, 18-in. diameter, 24-in. stroke; low-pressure, 26-in. diameter, 24-in. stroke; four-coupled wheels, 6 ft. 6 in. diameter. In both instances the quickest run was made on the last day in August. At present the distance between York and Newcastle is worked by compound engines and ordinary high-pressure express engines alternately, and the distance between Newcastle and Edinburgh is worked by compound engines almost exclusively.

The comparison of coal consumption was not taken specially during the accelerated running, but the same engines worked alternately between York and Newcastle with the ordinary Scotch express with an average of thirteen coaches, and the comparison gives for the compound engine 25 lbs. per mile, and for the ordinary express engines 31.4 lbs. per mile, showing a saving in favor of the compound engines of 6.4 lbs. per mile, or 20.3 per cent. The flying express train consisted of seven vehicles, as follows:

	Tons.
2 First-class carriages	31.3
2 Composite "	30.1
1 Third-class "	13.1
Vans	26
Tons	100.5
Ordinary express engine and tender	71
Compound " " "	81

No account has been given in this statement as to weight of passengers and baggage, but the trains were well filled.

Burning of Large Iron Works.

Three-quarters of the large iron ship building plant of the Globe Iron Works in Cleveland, Ohio, were burned last week. The burned portion of the shipyard was 700 ft. in lenght and 50 ft. in width, and it contained $100,000 worth of valuable machinery. Valuable models and drawings were ruined. Four large steel vessels in process of construction were upon the stocks, within a few feet of the burning buildings, but the ships were saved from damage. The loss is approximately fixed at $200,000, insured.

A French Railroad.

In the French island of La Reunion, Bourbon, there is a railroad which is worthy of note, on account of the many difficulties which were overcome in its construction, arising from the mountainous nature of the island, the rapid and variable streams, the tropical climate, and the nature of the business which it has to carry. This road has a gauge of 39.4 in. and is altogether 78 miles in length. There are in this short distance 4 tunnels, the total length of which is over 6·84 miles, and also many deep cuts and high fills. There are more than 200 bridges and culverts of less than 32.8 ft. in length, and besides these there 43 large bridges and viaducts having a total length of 8.04 miles. Included in these are 3 bridges of 328 ft. in length, one of 1312, ft., and one of 1,640 ft., and a viaduct 431 ft. long and 82 ft. in height. In the original location of the road it was provided that there should be no curve of less than 262.4 ft. radius; in the final location adopted there are found in three places curves of 351 ft., eight of 410 ft., twelve of 492 ft. and a large number of 656 ft. radius. There is no grade over 2 per cent., but grades from 1½ to 2 per cent. constitute a large part of the road. The superstructure is of steel rails of the Vignoles pattern, which were at first laid on prepared wooden sleepers; but most of these have been replaced by iron sleepers of the Livesey system, composed of two angle irons with a plate prepared to receive the chair and the bolts fastening the rail; these, it is expected, will last some time, and will obviate the trouble caused by the very rapid decay of the wooden ties in that tropical climate. The locomotives used weigh 15 tons, and can haul a load of 50 tons. The passenger cars are 16½ ft. in length, 7¼ ft. wide and have a wheel base of 6 ft. The freight cars are 13 ft. long, 7¼ ft. wide, with a wheel base of 6½ ft. They weigh 2.5 tons, and carry a load of 5 tons. The cost of the road, including the tunnels, was over $47,000 per mile, and its construction occupied about three years.

Steel Cross Ties.

Our Birmingham correspondent writes: The Welsh steel makers present in Birmingham yesterday reported that the steel sleeper trade is extending as regards demand. The countries adopting the metal sleeper are increasing in number, and I have information that good quantities are now regularly despatched to the leading lines in India, South America, Mexico, Australia and elsewhere. On the Indian State railways they are rapidly superseding the old cast iron bowl sleepers in consequence of the military danger attaching to the use of the latter, since it has been found by repeated experiment that a road laid on such sleepers can be destroyed with a few sledge hammers in an incredibly short time. Sleepers of ordinary sections are now quoted £5 7s. to £5 10s. per ton at Welsh works, and 120-lb. sections £5 2s. 6d. For underground colliery purposes, too, in South Wales as well as in the North of England, steel sleepers are being increasingly adopted, and I am informed that some colliery owners who have given them a trial have declared that they will never go back to timber. The increased price of Norwegian pit timber resulting from the higher freights is also just now working to the advantage of steel. The price of colliery steel sleepers is now about £8 per ton, which is equal to about 1s. each of the lengths and sections mostly supplied.—*The Engineer.*

Bids are asked for in the India Office, London, for steel cross ties for the Northwestern Railway of India. The quantities to be furnished, under the contract now open, are 277,200 ties and 610,000 steel keys for them. The gauge of the road is 5 ft. 6 in., and the ties are to be 8 ft. 9 in. over all. They are to be pressed from plates 1 ft. ½ in. wide by 9 ft. long. The plates vary in thickness from ⅛ in the middle to ¼ in. at the edges, and the whole tie is to weigh 120 lbs. In general shape this tie is very much like the Post cross tie, as used on the State Railroads of Holland. It is flanged down deeper in the middle than toward the ends, so that the tie is 8 in. wide at its narrowest part and 9½ in. wide under the rail. Clips for fastening the rail are made by cutting into the tie and turning up a portion of the metal. The tie has the radical fault of which we spoke last week in describing the Hartford tie, and a fault common to nearly all designs except the Hartford—that is, that the gauge of the rail is determined by the flange and not by the gauge line. These ties are designed for flange rails.

The South Indian Railway asks for 23,000 tons of rails with fish plates, 24,000 tons of steel ties and 800 tons of bolts, etc. Larger quantities of steel rails and ties are also wanted by the Southern Mahratta Company. And a larger order still for Victoria is being arranged.

Street Railroads in Berlin.

At the present time there are in Berlin, in addition to the ordinary tramways, no less than three steam street railroads. The first, in the Kurfürstendamm, is 3¾ miles long. The steam cars are of the Rowan type, and in summer time open passenger cars are employed. The cars, which are 31 ft. long and open on both sides, have a seating capacity for 40, and standing room for 5 persons. The cars for winter use are 26 ft. long, and seat 22 persons, while there is standing room for 5 passengers. Both independent locomotives and combined locomotives and cars are used, and the exhaust steam is condensed and employed to heat the feed water. The engines are of sufficient power to haul two cars, if necessary. The line was opened in May, 1886. For the construction of the second—the Teltow—railroad a company was formed at the beginning of 1887, with a capital of £8,750; but the line was only opened on the 1st July of this year. The third street railroad runs from the Rolleudorfplatz to Steglitz, and was opened in October last.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Regulation and Liabilities of Railroads.

In Iowa the Federal Circuit Court holds that while the Iowa statute of April, 1888, authorizing the Board of Railroad Commissioners to make and enforce a schedule of rates for railroad charges, is constitutional, still a court of equity will restrain the enforcement of a schedule when the rate prescribed will not pay the cost of necessary skilled service, the cost of the best appliances and keeping the same in proper condition, interest on bonds, and then leave something for dividends. It is no defense that the plaintiff is a foreign corporation, doing business in the state only as a matter of grace, and may retire when the business ceases to be profitable; or that it operates through other states, where no rates are fixed, which will enable it to make profit. Nor is it any defense that the reduced rates may increase the volume of business, and make it more remunerative than at present.[1] In another case decided by the same court in Minnesota it is held that the state railroad commissioners cannot enforce a schedule of rates for switching cars in a city, which fixes the compensation at less than the actual cost to the railroad company for the work.[2]

In Minnesota the Supreme Court holds that under the statute authorizing the district court to prescribe a location for the crossing of one railroad by another, the corporation whose land is taken for such a purpose is only entitled to have the place and manner of a necessary crossing so ordered as to be as little injurious to it as is consistent with the accomplishment, in a reasonable manner, of the purposes contemplated, regard being had for the interests and necessities of both corporations, as well as of the public.[3]

In Minnesota the Supreme Court holds that the fact that a railroad has once been lawfully constructed upon the grade of a street does not exempt it from bridging when that becomes necessary.[4]

In Minnesota it is held by the Supreme Court that where a railroad agreed generally by parole to take railroad ties of the plaintiff, but no definite amount or number were specified, the acceptance of a certain number actually delivered by the plaintiff cannot be held to obligate it to receive any more.[5]

Carriage of Goods and Injuries to Property.

In Wisconsin in a trial to determine the amount of damages to be paid for land condemned by a railroad company for depot purposes, the jury were instructed that they were to find the market value of the land taken at the time it was taken as a part and parcel of the lot of which it was a part; and also the damage to the market value of the residue of the lot in consequence of its being taken for the use of the company; also that market value was such a sum of money as the property was worth in the market to persons generally who would pay the just and full value; and again that the inconvenience to the plaintiff of parting with that particular piece of property, and its necessity to the company, should not be considered in arriving at the value. The Supreme Court, on appeal, rules that these instructions were correct.[6]

In Iowa in an action for the destruction of hay by means of fire from a locomotive engine, the Supreme Court rules that it was proper to give an instruction requiring the jury, in order to find for defendant, to find not only that the engine was properly equipped, but also that defendant's servants in charge were competent and skillful, and that the engine was properly operated.[7]

In the same state the Supreme Court holds that a team of horses attached to a sleigh, and wandering on the prairie at night, driven by a man in an unconscious, drunken stupor, does not constitute "live stock running at large" within the meaning of the Code, § 1,289, providing that for failure to fence a railroad the railroad company shall be liable for damages to such stock.[8]

In Iowa the Supreme Court decides that this section of the Code, which provides that a railroad company that fails to fence its road against "live stock running at large," at all points where such right to fence exists, shall be liable for stock killed by reason of such want of fence, etc., and that "the operating of trains upon depot grounds necessarily used by the company and public, where no such fence is built, at a greater rate of speed than eight miles an hour, shall be deemed negligence, and render the company liable under this section," does not apply to the killing of a horse while being driven by its owner across the track within the limits of the depot grounds.[9]

In Minnesota the plaintiffs were engaged in buying wheat at a warehouse owned by them on the line of the defendant's railway, for manufacturing into flour at their mill to which the wheat was shipped, and in selling the products of the mill at the same warehouse, and, while so engaged, and for a considerable time, their business was interrupted and interfered with by the obstruction of a street leading to the same by the unlawful occupation thereof with the defendant's cars and trains. The Supreme Court holds that, in estimating plaintiff's damages caused by such obstructions, evidence of the diminution of the profits of their business, including the manufacture of flour, was incompetent, as embracing too many elements of uncertainty to form a basis for estimating damages.[10]

In Iowa the Supreme Court rules that water which in flood-time leaves the channel of a well-defined river and overflows adjoining low lands, the current of the river widening to the full width of the water, is not surface water, so as to relieve a railroad company from liability for its obstruction.[11]

Injuries to Passengers, Employes and Strangers.

In Vermont it is held by the Supreme Court that it is the duty of a railroad which is carrying the mail under a contract with the United States, and by whose regulations postal clerks on mail trains are required to receive at the cars stamped letters, and sell stamps, to furnish a reasonably safe passage to and from its mail cars, while stopping at its regular stations, for the purpose of mailing letters; and a failure to provide such passage is actionable negligence.[12]

In Minnesota the Federal Court rules that one injured by a collision between two trains, on one of which he was a passenger, can recover against the company on whose road the other train was running, its engineer having caused the disaster by his negligence, although the engineer of the former train may also have been guilty of negligence.[13]

In Ohio the Federal Court holds that it is the duty of a railroad company to properly light the platform connected with its depot within a reasonable time before the arrival and departure of its trains, so as to insure the safety of persons coming to the depot as passengers. A person in good faith coming to the depot for the purpose of taking passage on the cars is to be regarded as a passenger, although a ticket may not have been purchased.[14]

In Pennsylvania the Federal Court rules that it is negligence in a railway company to leave unguarded a hole in a passage way at a railroad station likely to be employed by persons going to and from the company's cars.[15]

In Iowa the plaintiff was engaged as a car catcher in defendant's yard. With him were employed, besides a foreman, another car catcher and a switch thrower. It was the duty of the car catcher to ride the cars cut off to their destination, and to notify the switch thrower when they failed to clear adjoining tracks. The switch thrower's duty was to throw the switch under the direction of the foreman, and to notify him when the track was clear for another cut of cars. On the night of the accident plaintiff's companion had gone down on a cut of cars, and, after the switch thrower had announced "all right," the foreman started another car, which plaintiff attempted to board by climbing the ladder on the forward end, there being none on the side, when the car collided with the cars taken down by his companion on an adjoining track which had not cleared the track on which plaintiff's car was running. The night was very dark, and the car on which plaintiff was riding did not belong to defendant company. The Supreme Court, on appeal, refused to hold that the defendant company was not liable, but ordered a new trial on the ground that it was error on the part of the trial judge to allow the plaintiff to prove that there was a line of promotion in the business in which he was engaged, together with the salaries of the different grades, though plaintiff was shown to have been so injured as to be unfit for service, there being no evidence to show that plaintiff had any reason to expect promotion.[16]

In Maine the Supreme Judicial Court holds that though a traveler on a highway should look and listen before he attempts to cross a railroad track; and if he hears a train he should halt at some safe distance, if necessary, to ascertain if it is approaching on that track, yet it may not be contributory negligence if he does not halt, when he is deceived by surrounding circumstances without his own fault, as where the arms of the gate at the crossing were up, and the traveler relies on this as evidence that there is no train approaching.[17]

In Iowa a boy of the age of nearly 10½ years, and of average intelligence, who had been frequently in the vicinity of a railroad turn-table, and had a general knowledge of its structure and operation, and had been repeatedly warned by his father that it was dangerous to play upon it, and told not to do so, and knew that the railroad company prohibited children from playing on the table, and also knew that he had no right to play upon it, and that it was dangerous to do so, engaged with other boys in swinging upon it while in motion, and was injured by his foot being caught between the arm of the table and the stationary abutments. The Supreme Court decides that the conduct of the boy amounted to contributory negligence, although he might not have been of sufficient age and discretion to understand and comprehend the full extent of the danger to which his conduct exposed him, and the railroad company is not liable.[18]

1 C. N. & W. Ry. v. Dey, 35 Fed. Rep., 866.
2 C., St. P. & M. Ry. v. Becker, 35 Fed. Rep., 883.
3 Minn. & St. C. Ry. v. St. P., M. & M., 39 N. W. Rep., 65.
4 State v. M. & H. L. Ry. Co., 39 N. W. Rep., 153.
5 Russell v. W., M. & P. R. Co., 39 N. W. Rep., 302.
6 Esch v. C., M. & St. P. R. Co., 39 N. W. Rep., 129.
7 Bullis v. C., M. & St. P. R. Co., 39 N. W. Rep., 245.
8 Grove v. B., C. R. & N. R. Co., 39 N. W. Rep., 248.
9 Johnson v. C. & N. W. R. Co., 39 N. W. Rep., 242.
10 Todd v. M. & St. L. R. Co., 39 N. W. Rep., 318.
11 Moore v. C., B. & Q. R. Co., 39 N. W. Rep., 370.
12 Hale v. Grand Trunk R. Co., 7 N. Eng. Rep., 49.
13 Parshall v. Minn. R. Co., 35 Fed. Rep., 049.
14 Grimes v. Penn. Co., 36 Fed. Rep., 72.
15 Green v. Penn. Co., 36 Fed. Rep., 36.
16 Chase v. B., C. R. & N. R. Co., 37 N. W. Rep., 196.
17 State v. B. & M. R. Co., 6 N. Eng. Rep., 777.
18 Twist v. W. & St. P. R. Co., 39 N. W. Rep., 402.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Lowell, 3½ per cent., payable Jan. 1.
Central of Georgia, 4 per cent., payable Dec. 21.
Lehigh Valley, regular quarterly, dividend 1¼ per cent., payable Jan. 15.
Manhattan (Elevated), quarterly, 1 per cent.,
New York & Harlem, 4 per cent., payable Jan. 2.
Richmond & Danville, 5 per cent, payable Jan. 2.
Southwestern of Georgia, 3½ per cent, payable Dec. 21.
Tennessee Coal, Iron & Railroad Co., regular semi-annual dividend, 4 per cent. on the preferred stock, payable Jan. 2.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Cleveland & Pittsburgh, annual meeting in the office of the company in Cleveland, O., Jan. 2, 1889.
Connecticut River, annual meeting, Springfield, Mass., Dec. 18.
East Tennessee, Virginia & Georgia, special meeting, Knoxville, Tenn., Dec. 22, to consider the approval of the lease to the Richmond & Danville.
Housatonic, annual meeting, Bridgeport, Conn., Dec. 11.
Knoxville & Ohio, annual meeting, Knoxville, Tenn., Jan. 21 to consider the question of approving the lease of the Knoxville & Ohio to the East Tennessee, Virginia & Georgia, heretofore made in accordance with resolutions adopted by the board of directors.
New Orleans City & Lake, annual meeting, New Orleans, La., Dec. 17.
Norwood & Montreal, annual meeting, 96 Broadway, New York, Dec. 28
Pittsburgh & Lake Erie, annual meeting, Pittsburgh, Pa., Jan. 22.
Rome, Watertown & Ogdensburg, annual meeting, 96 Broadway, New York, Dec. 28.
Rome, Watertown & Ogdensburg Terminal, annual meeting, 96 Broadway, New York, Dec. 28.
Syracuse, Phœnix & Oswego, annual meeting, 96 Broadway, New York, Dec. 28.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Association of American Railway Accounting Officers meets at the Southern Hotel, St. Louis, Mo., Jan. 24, 1889.

The *American Association of Railway Chemists* will hold its next meeting in Baltimore, Md., Jan. 14, 15 and 16.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *Western Railway Club* meets the third Tuesday in each month in the Phenix Building, Chicago.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7.30 p. m. at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m. on the third Saturday in each month.

American Society of Civil Engineers.

At the meeting of Dec. 5 the following members were elected: Alfred Craven, George Wiley Freeman, William Edward McClintock, Norman James Nichols, Henry Whitbeck Potter, Edward Herbert Stone, Samuel C. Weiskopf. Associate: John Cresson Trautwine, Jr. Juniors: Thomas Warren Allen, Mark Fargusson, John Moyer Farley, Charles Francis Wood. A paper by Mr. Edward Bates Dorsey comparing the operating expenses of English and American railroads was read and discussed.

Engineers' Club of Kansas City.

A regular meeting was held Dec. 3. Mr. Clarence A. Burton read a paper on "The Steam Engine, Its Beginnings, Growth and Place in the Industries of To-day," which was discussed by Messrs. Pearson and Wynne.

Dec. 5th the annual meeting was held at 8 P. M., 14 members and 2 visitors being present. Reports of the various standing committees and of the officers were presented. The following nominations for officers for 1889 were made: *President*, O. B. Gunn and J. A. L. Waddell; *Vice-President*, W. H. Breithaupt and John Donnelly; *First Director*, T. F. Wynne and W. Kiersted; *Second Director*, S. H. Yonge and C. A. Burton; *Secretary*, Kenneth Allen and A. J. Mason; *Treasurer*, F. W. Tuttle and V. M. Witmer; *Librarian*, C. E. Taylor and Frank Allen.

BRIDGE REFORM.

The committee on bridge reform reported that the Western Society of Engineers, the Engineers' Club of St. Louis, the Engineers' Club of Cincinnati, the Engineers' Club of Philadelphia, the Boston Society of Civil Engineers and the Engineers' Club of St. Paul have appointed special committees on bridge reform. Discussion has been had by other societies also. All of these societies recognize the urgent need of a reform of some sort, and the sum of opinion is that such reform should be effected by legislation. The Western Society recommends the appointment of a state engineer. The committee of the Cincinnati Club thinks that the law should be uniform for all states. It should require filing of plans of all bridges. Within certain times the governors of the states should be empowered to require proper plans for new bridges and to appoint the state engineer, who should be responsible directly to him. All dangerous bridges should be publicly condemned and state bridge owners should be held accountable to the state for failure of their structures. The state bridge engineer should check plans of and inspect all bridges and should act as an adviser to the governor and legislature in all such matters. Owners should be heavily fined for bridge failures and for any non-compliance with the bridge laws, and should be prosecuted for manslaughter in case of loss of life in a bridge failure. The Boston Society is of the opinion that the society should proceed very cautiously in the matter of recommending legislation. The St. Paul, St. Louis and Philadelphia societies have not yet formally reported any action further than the appointment of special committees. The committee of the Kansas City Society has prepared a draft of a state bridge law. An informal conference was held in the city of Chicago about Dec. 1, at which were present members of the committee of the Western Society and of the St. Paul Society, as well as two of the committee of the Kansas City Society. The draft for the state law was submitted and discussed, and it was decided that a number of modifications are desirable. The committee recommends that when these modifications are made, this draft of the state law shall be printed and circulated among the engineering societies with a request for their comments thereon, and it is hoped that it will be in form for presentation during the session of the present legislature.

Engineering Society of the University of Michigan.

The engineering society of this university desires to communicate with all graduates and former students of the engineering department in order to obtain a record of work done by them since leaving Ann Arbor, in engineering or other pursuits. If a reasonably complete list of the old students and their occupations can be thus secured, the University authorities contemplate its publication in connection with a circular of information in regard to the engineering courses. Information should be sent to H. S. Crocker, Corresponding Secretary, Lock Box 46, Ann Arbor, Mich., from whom blanks and circulars can be had,

Engineers' Society of Western Pennsylvania.

The next regular meeting of the society will be held in the rooms, Penn Building, Pittsburgh, Tuesday, Dec. 18, at 8 o'clock, p. m. A paper by J. E. Greiner, Civil Engineer, on the new Pittsburgh Baltimore & Ohio depot will be read. The subject for discussion will be the paper by T. P. Roberts, C. E., on The Railroad Situation of Pittsburgh. It is expected that an interesting discussion will occur on this important question, a number of prominent railroad engineers taking part.

New York Railroad Club.

The next meeting of the club will be held at its rooms, 113 Liberty street, New York City, on Thursday evening, Dec. 20, at 7½ o'clock. The subject for discussion will be "Car Wheels and Axles for 60,000 lb. Freight Cars." Mr. J. N. Barr, Superintendent of Motive Power of the Chicago, Milwaukee & St. Paul, will be present and open the discussion. He will give something of his experience with the contracting chill process of making wheels

Western Railway Club.

The next meeting of the club will be held Dec. 18, at the Phenix Building, Jackson street, Chicago, at 2 p. m. The subjects for discussion are: "Relative Merits of Thick and Thin Tire; and to what extent are the railways moving to adopt the Master Mechanics' standard centre and tire;" "Water Circulation and Purification of Water." Mr. Herbert Hackney, Assistant Superintendent Machinery, Atchison, Topeka & Santa Fe, will open the latter subject with a paper.

PERSONAL.

—C. D. Drake, Treasurer of the St. Louis, Arkansas & Texas, died at St. Louis Dec. 5.

—A. P. Taylor has resigned as Division Engineer of the Pottsville division of the Philadelphia & Reading.

—Mr. Charles Hansel, of Springfield, Ill., Engineer of the Wabash road, was married in Bloomington last week to Miss Frances Parker.

—Judge W. H. McBrayer, a director of the Louisville Southern, died suddenly last Friday week at his home at Lawrenceburg, Ky., of paralysis.

—J. C. Nichols, having resigned the position of Acting General Baggage Agent of the Missouri, Kansas & Texas, P. M. Reade has been appointed General Baggage Agent.

—George A. Schuler, a member of the firm of McClure & Schuler, engineers and contractors, Pittsburgh, Pa., died in that city recently at the age of 51 years, of apoplexy.

—C. S. Elliott, formerly Private Secretary to General Manager McDonald, will assume the duties of General Passenger Agent of the Cairo, Vincennes & Chicago line on Jan 1.

—Daniel Jones, Controller of the Philadelphia & Reading Coal & Iron Co., is very dangerously ill with typhoid fever. He has been confined to his home in Philadelphia for three weeks.

—On Jan. 1 M. Burke, General Superintendent of the Mississippi & Tennessee road, now known as the Memphis branch of the Illinois Central, will retire. He will be succeeded by J. B. Kemp.

—The office of Through Freight Agent of the Pennsylvania, at present held by F. H. Kingsbury, has been abolished, and Mr. Kingsbury has been appointed Manager of the Union Fast Freight Line.

—The office of Car Accountant of the Chesapeake & Ohio has been separated from that on the Newport News & Mississippi Valley Co., Eastern division, and S. M. Bromberg has been appointed Car Accountant of the former road.

—W. H. Knight, Assistant General Freight Agent of the Wabash Western, having resigned to become General Agent of the Union Pacific at Chicago, John D. Lund has been appointed Acting Assistant Agent.

—H. C. Ives, formerly Assistant General Manager of the St. Paul, Minneapolis & Manitoba, has been appointed Superintendent of the Breckenridge division of that road, with headquarters at Minneapolis, Minn.

—George K. Warner has been appointed acting Treasurer of the St. Louis, Arkansas & Texas in place of C. D. Drake, Treasurer, deceased. Mr. Warner has been chief clerk in the Auditor's office for the past three years.

—President John Newell, of the Lake Shore & Michigan Southern, has confirmed the report that J. T. Harahan, General Manager of the Louisville & Nashville, is to be appointed Assistant General Manager of the Lake Shore & Michigan Southern, vice Edward Gallup, deceased.

—President Samuel Thomas, of the East Tennessee, Virginia & Georgia, has repeatedly tendered his resignation as President to the directors, but it has each time been declined. The directors appointed a committee to try and persuade General Thomas to withdraw his resignation, and he finally consented.

—Gen. T. J. Powers, one of the oldest civil engineers in the country, died in Rochester, Pa., Dec. 1, aged 81 years. He took part in the building of the Erie Canal, the Portage Railroad over the Allegheny Mountains, the Rome & Oswego and the Chesapeake & Ohio railroads, and the great locks on the Kanawha River in West Virginia.

—Elisha Atkins, a well known business man of Boston, died Dec. 9, aged 75 years. He was connected with the elder Ames in building the Union Pacific, and for many years was First Vice-President of that road. He was also formerly President of the Little Rock & Fort Smith road, and had large interests in other Western roads.

—Mr. I. W. Fowle, who has resigned his position as Master Mechanic of the New Orleans & Northeastern division of the Cincinnati, New Orleans & Texas Pacific, to go into business in Cincinnati, was last week presented by the Master Mechanics of the road and his employés with a very elegant French clock and a silver dinner set. A testimonial on satin signed by 140 of his men was also given Mr. Fowle.

—Col. Robert R. Bridgers, one of the oldest railroad men in the country, died in Columbia, S. C., Dec. 10, of apoplexy, 71 years of age. He won distinction at the North Carolina bar previous to the war. He was a member of the Confederate Congress. In 1865 he was elected Director, and in 1866 President of the Wilmington & Weldon, and he held that office at his death. He has been President of the Wilmington, Columbia & Augusta since 1871, and was President of the Manchester & Augusta, Florence, Midland North Carolina and Albemarle & Raleigh roads. For many years he was General Manager and Director of the Atlantic Coast Line system. He was for several years President of the Time Convention. Colonel Bridgers appeared before the Ways and Means Committee of the South Carolina Legislature the evening of Dec. 11 to argue against a bill fixing the bonded debt of railroads as the maximum valuation for taxes. While speaking he fainted, and died in an hour.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point, Western of Alabama, and Cincinnati, Selma & Mobile.—Wm. Hunter has been appointed Resident Engineer, in charge of the maintenance of way of the above named companies.

Atlantic & Danville.—A. D. Bateman, previously Superintendent of the Main Line, has been appointed Superintendent of all divisions, and Z. E. Cheatham, previously Superintendent of the James River Division, has been appointed Assistant Superintendent of all divisions.

Baltimore & Philadelphia.—The stockholders of the company held their annual meeting this week and the following board of directors was elected: Messrs. J. B. Washington, W. M. Clements, W. Canby, W. M. Canby, Victor Dupont, T. Frothingham, J. Van Smith, J. V. Patton and L. C. Cassidy. The board organized by the election of the following officers: President, John B. Washington; Vice-President and General Manager, William N. Clements; Secretary, Jonn C. Farra; Treasurer, W. J. Ijams, of Baltimore; Auditor, W. T. Thelin, of Pittsburgh.

Barre.—The officers are as follows: A. D. Morse, President; E. L. Smith, Vice-President; C. L. Currier, Treasurer; James Boutwell, Superintendent.

Boston & Albany.—The annual meeting of the stockholders of the company was held in Boston, Dec. 12, and the following directors were elected: William Bliss, of Boston; John Cummings, of Woburn; Edward L. Davis, of Worcester; Chauncey M. Depew, of New York; J. N. Dunham, of Pittsfield; E. B. Gillett, of Westfield; Edward D. Hayden, of Woburn; Samuel Hoar, of Concord; Moses Kimball, of Brookline; J. C. Rogers, of Peabody; J. A. Rumrill, of Springfield; Charles S. Sargent, of Brookline, and John P. Spalding, of Boston. The only changes were the substitution of the name of Edward D. Hayden for that of the late Henry Colt, of Pittsfield, and the name of John P. Spalding for Mahlon D. Spalding, deceased.

Boston & Maine.—A meeting of the company was held at Lawrence, Mass., Dec. 12. Directors were elected as follows: George C. Lord, of Newton; Amos Paul, South Newmarket, N. H.; Nathan J. Bradlee, Boston; W. S. Stevens, Dover; J. S. Ricker, Deering, Me.; Richard Olney, Boston; S. C. Lawrence, Medford; Frank Jones, Portsmouth, N. H.

Buffalo, Rochester & Pittsburgh.—Thomas H. Kirk has been appointed Trainmaster of the Rochester division, relieving E. D. Wells, who remains Trainmaster of the Buffalo division.

Burlington & Missouri River.—J. C. Peasley has been elected Treasurer, with office at Chicago, Ill., in place of J. N. Denison.

California & Arizona.—The incorporators of this road are C. W. Smith, William C. Hazeldine, D. McCool, H. Silver, A. Brunsen, F. T. Perris.

Chesapeake & Ohio.—F. I. Cable, formerly Engineer of Maintenance of Way on the Virginia Midland, has been appointed Assistant Engineer of the Chesapeake & Ohio, in charge of bridges under construction.

Chicago, Burlington & Quincy.—J. C. Peasley, previously Vice-President, is now First Vice-President.

Chicago, St. Louis & Pittsburgh.—The office of the Superintendent of the Eastern division has been removed to Indianapolis, where it will hereafter be located. The yards and shops of the company at Richmond, Ind., will now be under the charge of the Superintendent of the Southern division, whose office is at that place.

Cleveland, Lorain & Wheeling.—W. B. Hanlon has been appointed Chief Engineer of this company, in place of C. M. Barbour, resigned.

Coudersport, Hornellsville & Lackawanna.—The company was organized in Hornellsville, N. Y., last week by the election of the following officers: President, D. C. Larrabee, Treasurer, H. J. Olmsted; Secretary, C. L. Peck; Directors, P. A. Stebbins, William Dent, A. B. Crowell, W. B. Perkins, F. A. Raymond, Amos Raymond, Thomson Coulston.

Des Moines & Kansas City.—John C. Newton is now in charge of this road as General Manager, in place of James Donohue, Superintendent.

Des Moines & Northwestern.—E. P. Shearer has been appointed Master Mechanic of this company and the St. Louis, Des Moines & Northern, vice F. W. Morse, resigned.

Eastern.—At the annual meeting of the stockholders in Boston, Dec. 12, the following Board of Directors was elected: Samuel C. Lawrence, Boston; Nathan J. Bradlee, Boston; Frank Jones, Portsmouth; George O. Carpenter, Boston; Arthur Sewell, Bath; H. D. Hyde, Boston; Joseph H. Gray, Boston; Walter Hunnewell, Wellesley; S. Endicott Peabody, Salem.

East Tennessee, Virginia & Georgia.—The directors of this road this week elected Samuel Thomas, President; Calvin S. Brice, Vice-President; L. M. Schwain, Secretary, and J. M. Mitchell, Treasurer.

Evansville, Suburban & Newburgh.—Following are the names of the officers: President, L. Howell; General Manager, W. J. Wood; Chief Engineer, B. A. Wood. The chief office is at Evansville, Ind.

Freehold & New York.—The reorganization of the old company is completed, and the new board of directors consists of Charles J Coaney, John J. Moore and Edward D. Adams, of New York; Justus E. Ralph, William H. Vredenburgh, Theodore W. Morris and Frank B. Conover, of Freehold. Edward D. Adams is President of the company, vice J. E Shultze, and Justus E. Ralph the Secretary, Treasurer and Superintendent.

Georgia Southern & Florida.—S. C. Hoge is now Superintendent of Transportation, and, in addition to his other duties, has charge of car records.

Gulf, Houston & Rio Grande.—At the annual meeting of the stockholders of the Gulf, Houston & Rio Grande, held in Houston, Tex., Dec. 5, the following Board of Directors were elected: E. W. Smith, James W. Potter, of Boston; J. C. Ruff, of New York, and J. W. Smith, A. Cross, J. L. Mitchell and S. Packard, of Houston.

Houston, East & West Texas.—The directors have elected John C. Short President, S. K McIlhenny Vice-President, and Wm. A. Miner Treasurer.

Houston & Texas Central.—Judge Don A. Pardee, Judge of the United States Circuit Court, at Galveston, Tex., last week issued an order relieving Nelson S. Eaton and James Rintoul from further duty as Receivers of the road, and creating Charles Dillingham sole Receiver.

Illinois Central.—J. B. Kemp has been appointed Superintendent of the Memphis Division, vice Maj. M. Burke resigned, to go in other business. The Aberdeen Division, from Aberdeen, Miss., to Durant, Miss., will hereafter be discontinued as a separate division and merged with the Mississippi Division, under the superintendency of Horace W. Clarke, with headquarters at Jackson, Tenn.

Indianapolis, Decatur & Western.—R. L. Van Sant has been appointed Chief Engineer, with headquarters at Indianapolis, Ind.

International & Great Northern.—J. E. Galbraith, General Freight and Passenger Agent, has issued an order abolishing the office of Traveling Freight Agent, and appointing F. O. Becker General Agent, with headquarters at Galveston, Tex.

Kansas City, Fort Smith & Southern.—The officers of this company are announced as follows: L. L. Bush, President and General Manager; Mathias Splitlog, Vice-President; H. W. Bush, Secretary and Auditor; J. C. Cravens, Treasurer; H. M. Fickinger, Superintendent; S. R. Patterson, Chief Engineer. General offices, Neosho, Mo.

Kansas City, Independence & Park.—W. A. Bunker has been appointed Vice-President, J. R. Chapman General Manager, and J. W. Byers Treasurer.

Kansas City & Southern.—The headquarters of the road are in Kansas City, Mo., and the following officers are announced for the ensuing year: W. E. Gray, General Manager; J. E. Smith, General Freight and Passenger Agent; R. D. Blair, Purchasing and Claim Agent; W. E. Reeves, Master Mechanic; J. V. Good, Train Master and Superintendent of Telegraph, and David McCove, Road Master.

Keyport.—The first directors of this New Jersey company are: Justus E. Ralph, Frank B. Conover, Judge Alfred Walling, Jr., S. L. Bennett, John Thompson, W. G. Murray and Joseph McDermott, all of Monmouth County.

Knox & Lincoln.—At the annual meeting in Bath, Me., Dec. 5, the following directors were elected: J. T. Berry, Francis Cobb, A. F. Crockett, of Rockland; J. G. Richardson, J. R. Kelly, J. W. Wakefield, of Bath; E. K. O'Brien, of Thomaston; E. O. Clark, of Waldoboro; D. W. Chapman, of Damariscotta; Ebenezer Haggett, of New Castle; Henry Ingalls, of Wiscassett. The directors organized by electing John T. Berry, of Rockland, President, and John G. Richardson, of Bath, Clerk. William L. White was re-elected Superintendent; F. H. Low, Treasurer; William B. Ludwig, Roadmaster, and Charles L. Turner, Master Car-builder.

Louisiana, Arkansas & Missouri River.—The stockholders of the company met in Brinkley, Ark., Dec. 3, and after electing directors the following officers were elected by the directors: H. M. Hoyt, New York, President; Logan H. Roots, Little Rock, Vice-President; C. T. B. Keep, New York, Secretary, and C. R. Miller, New York, Treasurer.

Louisville & Nashville.—Harry Frazier, Roadmaster of the Henderson Division, has been promoted to be Roadmaster of the South and North Division, at Montgomery.

Louisville Southern.—R. S. Veech has been elected Second Vice-President. Car service reports should be addressed to A. H. Ford, Auditor, instead of E. W. Harper, formerly Car Accountant.

Marquette City & Presque Isle.—Timothy Nester is President and F. Hefferman is Secretary of this Michigan road.

Missouri, Kansas & Texas.—J. A. Smith has been appointed Commercial Agent, with headquarters at Waco, Tex., in charge of the territory in Texas south of the main line of the Texas & Pacific. J. C. Mow, with headquarters at Fort Worth, will continue in charge of the territory in Texas on and north of the main line of the Texas & Pacific.

Montreal & Sorel.—Ed. C. LaLonde, General Manager, is also Secretary and Treasurer, in place of E. C. Wurtele.

Newport News & Mississippi Valley.—W. W. Monroe, now General Freight Agent, will also assume the duties of General Passenger Agent on Jan. 1, in place of H. W. Fuller, who will sever his connection with this company on that date.

On Jan. 1, 1889, the office of Car Accountant of the Eastern Division of the above company will be separated from the Chesapeake & Ohio at Richmond, Va., and removed to Lexington, Ky., with S. A. Bromberg as Car Accountant.

New York, Chicago & St. Louis.—An official circular has been issued announcing the appointment of T. B. Hindel as Master Mechanic of the Western division, vice W. H. Lewis, resigned, with headquarters at Stony Island, Ill.

New York & New England.—Directors were elected as follows at the annual meeting in Boston this week: W. P. Shinn, J. H. French, E. C. Fitz, Eugene R. Thayer, Charles A. Prince and Royal E. Robbins, of Boston; A. R. Sheldon and B. F. Vaughn, of Providence; James L. Howard, of Hartford; David S. Plume, of Waterbury; George M. Landers, of New Britain; Thomas Rutter, John L. Macaulay, Alexander E. Orr, Sidney Dillon, Henry Hentz and J. A. Bostwick, of New York; Arthur Sewall, of Portland, Me., and E. V. Carey, of New York. The only changes are the dropping of Sterne Morse, Moses T. Stevens, W. H. Stevens, W. H. Starbuck and I. Morton, whose places are filled by Eugene R. Thayer, Charles A. Prince, Royal E. Robbins and David S. Plume. At a subsequent meeting of the directors the present officers were re-elected.

New York & Northern.—William D. Basley is now Auditor, with headquarters at High Bridge, New York City, vice J. W. Reinhart, resigned.

New York & Sea Beach.—The annual meeting of the company, held Dec 10, resulted in the election of the following directors: George F. Baker, Albon P. Man, John Barker, Charles C. Brotherce, Benjamin B. Lawrence and Alrick H. Man. Mr. Lawrence succeeds the late F. A. Potts.

Northern Pacific.—Frank Greene, formerly Superintendent of the Missouri Division, has been appointed to succeed N. D. Root as Superintendent of the Minnesota & Wisconsin Division, with headquarters at Brainerd, Minn.

Pennsylvania Company.—Frank Thomson and Amos R. Little have been elected directors, filling the places made vacant by the death of J. P. Wetherill and Edmund Smith.

Pittsburgh, Cincinnati & St. Louis.—Frank Thomson has been elected a director, to fill a vacancy.

Pittsfield & North Adams.—At the annual meeting in Boston, Dec. 12, the following board of directors was chosen: J. N. Dunham, of Pittsfield; Edward Jackson, of Boston; C. S. Sargent, of Brookline; F. H. Appleton and C. E. Stevens.

Portland & Rochester.—At the annual meeting in Portland, Me., last week, the board of directors were re-elected as follows: George P. Westcott, Nathan Webb, William L. Putnam, Charles McCarthy, Jr., and James P. Baxter, Portland, Me.; George C. Lord, Newton, Mass.; Stephen J. Young, Brunswick, Me.; Josian S. Ricker, Deering, Me., and Arthur Sewell, Bath, Me. George P. Westcott is President; William H. Conant, Treasurer, and Joseph W. Peters, Superintendent

Poughkeepsie Bridge Company.—The head office of this company is in Philadelphia, and the official announcement has been issued of the election of John S. Wilson, late general traffic agent of the Pennsylvania Railroad, as President of the company. All the other officers were re-elected. Mr. Wilson was also elected President of the Hudson Connecting Railway, the Poughkeepsie & Connecticut Railway, and the Poughkeepsie Bridge Railway companies.

Richmond & Danville.—At a meeting of the directors of the company, this week, the former officers were re-elected.

Richmond & West Point Terminal.—At the annual meeting in Richmond, Va., this week, a resolution was adopted increasing the board of directors from 16 to 18. All the old officers were re-elected.

Rockland, Rockport & Camden.—The annual meeting of the company was held recently in Portland, Me., and chose the following directors: P. J. Carleton, F. E. Richards, A. F. Crockett, Henry B. Cleaves, S. E. Shepperd, P. A. Hunt, S. M. Bird, S. D. Carleton, H. L. Shepperd.

Southern Pacific.—C. W. Bien has been appointed Assistant General Freight Agent with headquarters at New Orleans.

Stuttgart & Arkansas River.—The stockholders of the road met at DeWitt last week, and elected James A. Gibson President; Edward Hall, Vice-President; T. C. Malaby, Treasurer, and Thomas H. Leslie, Secretary; R. P. Holt, W. Durell, A. D. Swan, T. H. Leslie and J. H. Hutchinson, Directors.

Ultima Thule, Arkadelphia and Mississippi.—The officers of this company are as follows: R. W. Hine, President; C. C. Henderson, Superintendent, Dalark, Ark.; E. C. Wilder, Secretary and Treasurer; F. W. Swift, Auditor and General Freight and Passenger Agent. General offices, Arkadelphia, Ark.

Wabash, Chester & Western.—J. R. Hawkins has been appointed Superintendent, and will have general supervision of the track, bridges, motive power and rolling stock.

Williamsport & Binghamton.—The following are the officers of the company: President, F. M. Ward, Newton, N. J.; Vice-President, Edgar Munson, Williamsport; Treasurer, E. J. Sterling, New York; Secretary, Charles F. Camp, Williamsport; General Solicitors, Candor & Munson, Williamsport; Chief Engineer, P. E. Alden, Monroeton, Pa.; Consulting Engineer, Col. A. P. Barthoud, New York. The Directors of the company are: Joseph P. Noyes, John Ray Clarke, James B. Weed, Binghamton; Ward Deuell, Little Meadows; Isaac O. Blight, Towanda; Charles Kilgore, New York; F. M. Ward, Newton, N. J.; Edgar Munson, E. R. Payne, R. M. Foresman, William Gibson, J. E. Dayton and Elias Deemer, Williamsport.

OLD AND NEW ROADS.

New Companies Organized.—California & Arizona.—Keyport.

Albemarle & Raleigh.—It is thought that the extension of this road easterly from Williamston to Plymouth, N. C., 22 miles, will soon be constructed. It has already been surveyed. It will connect with the Jamesville & Washington road at Jamesville, midway between the termini.

Albion & Corydon.—President M. J. O'Connor announces that immediate steps will be taken toward extending this line from its present terminus at Corydon, Ind., three miles toward the East. Further extensions will be made in the spring.

Arizona Mineral Belt.—This road, extending from Flagstaff, Ariz., on the Atlantic & Pacific, southward, 36 miles, was sold at sheriff's sale at Prescott, Ariz., last week to Maj. D. M. Rurdon, to satisfy claims amounting to $42,000.

Atlantic, Gulf & Havana.—The contracts for building this road will probably be let within 60 days. The line is projected to extend from St. Augustine south to Tampa Bay, Fla., 170 miles, via Daytona and De Land. The company has purchased the graded right of way of the St. Augustine & South Coast, extending from St. Augustine south eight miles, and the preliminary survey from the end of this to the St. Johns River, near De Land has been made. Nearly all the right of way to Daytona is secured. John D. Stetson, of Philadelphia, is President, and D. D. Rogers, of Daytona, Fla., is Chief Engineer.

Barre.—This road, extending from Barre, Vt., to the granite quarries, four miles distant, is about completed, the track on one side of the mountain having been laid, and that on the other side nearly so. The total length of the road is eight miles, there being a line on each side of the mountain. The location of the road was begun in April last, and construction late in June. The rise from the town to the summit is 875 ft., and the grade for the greater part of the distance is 264 ft. to the mile. The difference in elevation and the short length of road made it necessary to construct a switch-back on the side of the mountain two miles from the town. The work has been done by Ward Bros., of Kennebunk, Me., under the supervision of Ward Crosby, chief engineer. D. R. Sortwell, of Cambridge, has the controlling interest in the road, and is also building a branch, which will be finished by Jan. 1 from Barre to Barre Junction in the town of Montpelier, four miles distant, to connect with the Montpelier & Wells River road. The work is being done by the same parties.

Calgary & Montana.—This is the name under which the Northwestern Coal & Navigation Co. will build its proposed line from Fort Benton, Mont., to Lethbridge, N. W. T. W. D. Barclay is now surveying the line.

California & Arizona.—This company has been organized to build the new grade of the Atlantic & Pacific between Powell Station and the Needles, Cal., 14 miles, which will be necessary to connect with the new bridge over the Colorado River at the latter point.

Camden, Rockport & Rockland.—A large amount of stock has been subscribed, and it seems probable that the road will be built at an early date. It will extend from Camden or Rockport to Rockland, Me., connecting with the Knox & Lincoln.

Chicago, Burlington & Northern.—The company has made an arrangement with the Illinois Central by which it will run trains from its main line at East Dubuque to Dubuque, Ia., over the bridge of the latter company across the Mississippi. Hitherto cars have been transferred by boat.

Chicago, St. Paul & Kansas City.—It is stated that the officers of this road have made propositions to the towns in the northern part of Clay County, Mo., offering to build their Kansas City extension by that route, if the company is given $1,500 per mile of road built.

Cincinnati, Hamilton & Dayton.—This road commenced running all its main-line passenger trains through Piqua this week, only the freight trains using the old main line a short distance east of the new line.

Cincinnati, Indianapolis, St. Louis & Chicago.—The company has abandoned the tunnel on the Eastern division, taking up the tracks through it, and is sending all its freight, as well as passenger trains, over the North Bend cut-off.

Cincinnati, Wabash & Michigan.—General Manager Beckley states that the company is still determined to extend the line from Anderson to Rushville, a distance of 40 miles, which will give the company a direct route to Cincinnati, and by crossing the Ohio, Indiana & Western's eastern division will give it also an important eastern outlet. This line has been partly graded, and work was suspended last June.

Cleveland, Canton & Southern.—It is stated that this company, which is the successor to the Cleveland & Canton, in addition to the branches and extensions now under construction, will also extend its Sherrodsville branch from Sherrodsville, O., through Harrison and Jefferson counties to Portland on the Ohio River, and from there down to Martin's Ferry, making a total distance of 48 miles. This will give the Cleveland, Canton & Southern valuable connections with West Virginia lines.

Dayton & Faunsdale.—Grading has been begun on this new Alabama road, the contract for which has been let to King and Hannan, of Selma, Ala. The road will be completed by April 1. It is to extend from Dayton to Faunsdale, eight miles.

Delaware & Hudson Canal Co.—The officers of the company have a project in view looking to the shortening of the Gravity road between Honesdale and Carbondale, Pa., whereby some two miles in distance can be saved for passenger and freight trains. Only a short piece of road will have to be built near Carbondale to accomplish this end. There is a heavy freight traffic over this division.

Dexter & Newport.—At an adjourned meeting of the stockholders of this 14-mile Maine road, it was voted to modify the 30-year lease to the Maine Central, which expires in November, 1898, making it for 99 years at five per cent. on the stock, the Maine Central assuming payment of the company's bonded indebtedness and all other liabilities. The stock is $122,000, and the bonds $175,000; hitherto, the payments on both have been at 6 per cent.

Duluth, Red Wing & Southern.—The grading from Red Wing to Zumbrota, Minn., has been completed and track laid on the first 20 miles from Red Wing.

East Tennessee, Virginia & Georgia.—The minority stockholders of the road have withdrawn the two last bills filed by them in Chancery Court at Knoxville, one to enjoin the directors of the company from ratifying the lease of the property, and the other asking for the immediate appointment of a receiver.

Elgin, Joliet & Eastern.—Articles were filed this week in Chicago consolidating the Elgin, Joliet & Eastern of Indiana with the Elgin, Joliet & Eastern of Illinois as the Elgin, Joliet & Eastern. The capital stock is placed at $4,000,000. The Joliet, Aurora & Northern will also be operated by this company.

Gloucester & Atco.—It is reported that the United States Express Co. has abandoned the idea of constructing the road from Gloucester City to Atco, N. J., and that satisfactory arrangements have been made for the purchase of a controlling interest in the Camden, Gloucester & Mount Ephraim, and that the road would be extended from Mount Ephraim to Atco.

Harrisburg & Baltimore, Eastern Extension.—A charter has been granted at Harrisburg, Pa., to this company to build a line from Porter's Station, on the Harrisburg & Baltimore, to the city of York, Pa., about 14 miles. The capital stock is $140,000.

International.—The legislature of the state of Durango, Mex., has granted to the road the right of way from Torreon, its present junction with the Central, to the city of Durango.

Iowa Central.—Deeds have been filed in Iowa conveying the lines and property of the Central Iowa Railway to the

Iowa Railway Company, organized by the purchasers of the road at the Master's sale a year ago, at which the main Iowa line was bid off for $2,400,000 and the Iowa branches for $400,000. Another deed from the Iowa Railway Company to the Iowa Central Railway Company, organized by the same interest under the laws of Illinois, conveying the lines and property of the Central Iowa in the state of Iowa to the last-named corporation, has been filed. This is to be for the purpose of both consolidating the Iowa and Illinois lines of this road under one organization and to conform to the laws of Illinois. This will take the road out of the hands of the Receiver. A mortgage of $7,650,000 has also been filed executed by the Central Iowa to the Mercantile Trust Co. of New York, with interest at five per cent., and payable June 1, 1938.

Joliet, Aurora & Northern.—All the property and effects of this company have been transferred to the Elgin, Joliet & Eastern, the two roads being under the same control. Together they form a line from Spaulding, on the Chicago, Milwaukee & St. Paul, near Elgin, Ill., southeast via Aurora to Joliet, and thence eastward to McCool, Ind., on the Baltimore & Ohio. From Joliet eastward the line closely parallels the Joliet branch of the Michigan Central.

Kansas City, Fort Smith & Southern.—Grading on this road is now finished to the station in Joplin, Mo., completing the road between that point and Neosho, on the Missouri Pacific. It is expected to have the road in operation very soon from Joplin through Neosho to Sulphur Springs, a distance of 55 miles.

Kansas City & Southern.—A branch of this road is now being constructed from Dodson Junction to Westport, a distance of 10 miles, and will be completed within two weeks.

Kansas City, El Paso & Mexican.—Three attachments have been levied on the property of the road to satisfy claims amounting to $22,000 against the contracting builders of the road, Morris R. Locke & Co. The Texas Pacific has a claim for over $15,000 for freight charges. The company has just completed 10 miles of road from El Paso, Tex. A local paper states that "President H. L. Newman says the embarrassment is caused by the failure of the New York capitalists who have been backing Locke & Co. to fulfill their agreement to furnish funds enough to meet all obligations when 10 miles of the road was completed. President Newman is confident that other capital will be speedily secured with which to go on building the road."

Kentucky Union.—On the extension southeasterly from Clay City to Jackson, Ky., the grading has been completed between Clay City and Three Forks, and it is thought that much of the heavy work between Three Forks and Jackson will be completed before winter sets in. There are three tunnels on the line. The one in Breathitt County is 1,400 ft. long; that in Wolfe, 1,200 ft., and the one in Powell, 800 ft. The company is securing the right of way for a proposed extension northwesterly from Winchester to Lexington, Ky. The right of way from Winchester to Jackson has already been secured.

Keyport.—This is the name under which the extension of the Freehold & New York to Atlantic Highlands, N. J., is being built. Only part of the line will be built this year, and next spring the line will be extended to Leonardsville and the Atlantic Highlands.

Knoxville Southern.—McDonald, Shea & Co., of Knoxville, Tenn., have been awarded a contract for grading 20 miles of road in McMunn County.

Lancaster.—The rails on this unused Massachusetts road are being taken up. The line, built in 1873, is 8½ miles long from Lancaster to Hudson, Mass., and it was leased to the Fitchburg and the Worcester & Nashua (which is now controlled by the Boston & Maine), but trains were never run. The cost of the road is said to have been $230,000. The ownership is understood to be largely in the hands of one man.

Lincoln Park & Charlotte.—This company has filed in New York a map of the road, which is projected to connect the Buffalo, Rochester & Pittsburgh and Rome, Watertown & Ogdensburg systems. It will cross the Falls branch of the New York Central overhead, and cross the Erie Canal. Adrian Iselin, Jr., President, and H. W. Hoyt, Chief Engineer of the Buffalo, Rochester & Pittsburgh, hold the same positions on this road.

Louisville & Nashville.—On the Cumberland Valley extension, from Pineville, Ky., to Cumberland Gap, Tenn., a distance of 14 miles, the work of construction is being pushed as rapidly as thought advisable, and the tunnel near Pineville is now finished. This extension has been surveyed to Big Stone Gap, Va., 75 miles from Pineville. Mason, Hoge & Myer are the contractors for that part now under construction.

Maine Shore Line.—Col. Joseph N. Greene, President of the company, states that the whole line from Hancock to Calais, Me., has been surveyed and about 30 miles of it located and 2½ miles graded. The maximum grades are 1½ per cent. There will be a large iron bridge with a draw at Sullivan, Me., requiring 13 spans of from 80 to 170 ft. The line is projected in the interest of the Boston & Maine, Maine Central and Grand Southern of New Brunswick roads, furnishing a short route to St. John. Advantageous traffic contracts have been made with the first two of the above companies. Right of way for 12 miles and $100,000 of local aid have been secured.

Maryland Central.—This road, which extends from Baltimore to Delta, Md., 44 miles, and which has been in the hands of a receiver for some time, was sold last week for $600,000. It was purchased by John K. Cowen, General Counsel of the Baltimore & Ohio, and others, in the interest of that road.

Mexican Railroads.—A dispatch from Laredo, Tex., Dec. 6, says: Some time ago the business men of Latorice and Manhala, Mex., 1,000 miles below Saltillo, subscribed a sufficient amount of money for the building of a branch of the Mexican National from Vamyias, on the main line, to Charcosat, the foot of the mountain below Catorce. This line is being built for the purpose of transporting ores to the main line of the Mexican National, over which they can be shipped to the United States. The Vamyias branch, as it is called, is about 20 miles in length; the grading is now complete, and the rails will be laid at once.

The Legislature of the State of Durango has granted to the International road the right of way from Torreon, its present junction with the Mexican Central, to the city of Durango.

The state of Guanajuato has granted a subsidy of $3,000 per kilometre for the construction of a railroad from Valte Santiago to Salamanca, the same road to continue on to Jarral, but without a subsidy outside the state.

Mexican Southern.—The engineers at work on this road, formerly known as the Oaxaca Railway, have located the line as far as Tecomavaca, 93 kilometres south of Tehuacan, and the preliminary surveys have been carried on as far as the city of Puebla, where the new road will connect with the Interoceanic and Mexico & Vera Cruz railroads. The contractors hope to begin actual construction early in 1889 and complete 228 kilometres in 18 months.

Mexico.—It is reported that a German company has got a charter for a railroad from Bagdad, at the mouth of the Rio Grande, to Matamoras, Mex., thence to San Luis Potosi.

Mississippi Southern.—It is stated that arrangements have been nearly completed for commencing construction work on this road, which is projected to extend from Natchez, Miss., toward Decatur, Ala. T. G. Stuart, of Louisville, is one of the directors.

Missouri, Kansas & Texas.—A survey has just been begun for a proposed line to extend from Waco to Trinity, Tex., passing through McLennan, Limestone, Leon, Houston and Trinity counties, a distance of about 85 miles, intersecting the Houston & Texas Central at Thornton and the International & Great Northern at Marquez.

Work was commenced last week on the extension from Dallas to Hillsboro, Tex., a distance of 66 miles. Tracklaying will soon be begun and pushed rapidly to completion. The line has already been nearly all graded.

Missouri Pacific.—The City Council, of Atchison, Kan., has accepted the proposition of the company to locate extensive car and machine shops in the suburbs of that city, in consideration of $100,000 bonds heretofore voted by the people for that purpose.

Mobile & Dauphin Island.—It is reported that the bonds of this Alabama road have been placed in London and that arrangements will soon be commenced for constructing the road.

Mobile, Jackson & Kansas City.—Arrangements are about completed for putting an engineer corps in the field to finish the location of this line, formerly the Mobile & Hattiesburg. This road lately acquired the right of way and roadbed of the old Mobile & Northeastern, H. Austill is General Manager.

Mt. Pleasant, Santee & Little River.—This is a proposed line from Mt. Pleasant, near Charleston, S. C., to Conway, which will pass through a fine agricultural country at present undeveloped. Surveys are in progress, but capital to build the line has not yet been secured.

New York & Boston Inland.—The company has filed notice of a petition to the Legislature of Massachusetts for an extension of time to April 1, 1892, in which to build its road.

New York & Brooklyn Bridge.—The annual report of President Howell, of the Bridge Trustees, for the year ending Dec 1, has just been made to the Mayors of New York and Brooklyn. The receipts have been $917,961, divided as follows: Promenade, $16,969; roadway, $67,231; railroad, $833,760. The total number of passengers in the cars was 30,331,283, and on the footway, 2,785,533. The increase in the total over the previous year was 2,512,090, and the increase in revenue, $67,237. For the year the receipts from all sources were $1,012,254, and the expenditures for running expenses, $831,497. For new equipments, land, buildings, etc., $234,166 was spent. The trustees have a rent roll amounting to $84,880 for the year. Fifty-eight persons were accidentally injured by falling and other causes; there were 42 runaways, and 2 persons committed suicide on the bridge. The platforms were increased in size for four-car trains, elevated railroad connections were made in Brooklyn, the cable-driving plant was completely renewed, and other improvements were made. The total delays in the running of trains amounted to eight hours and 23 minutes in the year, and no serious or fatal accident occurred to the passengers in the cars. At the December meeting of the trustees a petition of the conductors on the bridge cars to have their hours reduced from ten to eight hours per day at the same pay of $2.50 was granted. It will cost the bridge about $6,000 a year.

New York & New England.—At the annual meeting of this road in Boston on Tuesday of this week the old board was re-elected, with the exception of a few changes, as noted in another column. There have been many rumors lately concerning the buying and selling of the stock, and a change of control was predicted, but the reports prove groundless. President Bostwick explained concerning the contract which the directors have made with the Hudson Suspension Bridge & Railroad Co., which proposes to bridge the Hudson River near Peekskill, that the New York & New England assumed no responsibility except to give traffic to the bridge when completed. Mr. Bostwick referred to the three bridge projects over the Hudson River, and said that the directors, after considering all of these, had decided that the suspension bridge was the best in every way for the line and for its through traffic. The bridge company is to build its bridge; to build roads at both ends, the one on the east to the New York & New England, and that on the west connecting with the Erie. The contract provides that the road shall control all the traffic on the bridge to a point 18 miles on the east side and to a point 1½ miles beyond it on the other side. The road is to give to the bridge all the traffic that it can reasonably and profitably. The arbitrary rates on passengers shall be 25 cents, and 20 cents a ton for anthracite coal, and on all other classes of freight the rates are to be pro-rated on a basis of 60 miles for the bridge and its railroad property at either end. When the earnings of the bridge shall be sufficient to pay the interest on the bridge bonds, provided from the sinking fund, and pay 2 per cent on the stock, the arbitrary rates shall be reduced to a basis of 50 miles; when 4 per cent. is earned on the stock, the pro rate shall be 40, and when 6 per cent. it shall be reduced from time to time, so that at no time shall the income be more than sufficient to pay the interest, provide for the sinking fund and pay 6 per cent. on the stock. The railroad company is to operate the bridge for 75 per cent. of the gross earnings; the road builds a line from Brewsters to Somerstown to connect with the tracks of the bridge; the bridge will, it is expected, be completed in about 2½ years. In answer to criticisms it was stated that no director of the New York & New England was interested personally in the bridge company, and that the promotors of the bridge were believed to be responsible parties. The contract provides that the plans and cost of the bridge shall be satisfactory to the New York & New England. After some opposition the contract was approved.

President Bostwick stated that new terminal facilities in a good location on the East River, New York city, had been secured, and that the steamers of the Norwich Line (which line is controlled by this road) would be run to the new dock, thereby saving half an hour's time on each trip, the present landing place being around on the west side of the city. It is also proposed to establish a freight line from Wilson's Point (Norwalk), the southern terminus of the Danbury & Norwalk, to New York, and to do this the "New England Terminal Company" is to be formed, with a capital stock of $200,000, of which the New York & New England road takes half and the Danbury & Norwalk and Housatonic roads the other half. First mortgage bonds of the Terminal Company will be issued to the amount of $80,000, principal and interest to be guaranteed by the roads named.

Northern Pacific.—The Palouse branch will be extended to Julietta and possibly to Carnes Prairie in the early Spring.

Ohio Valley.—The Court of Claims of Christian County, Ky., has decided to test the legality of the proposed issue of bonds, which were voted to be issued to this road and the Cairo & Tennessee River for completing their road, each company receiving $200,000. Despite this decision the company is making preparations for beginning work on the extension from Hopkinsville to Princeton, and it claims that the court has no authority in the matter.

The company has made a proposition to the citizens of Evansville, Ind., to bridge the Ohio River at that place, in consideration of $100,000, to be paid when the work is completed, and a vote on the proposition has been ordered.

Oregon Railway & Navigation Company.—Corey Brothers, contractors on this company's Cœur D'Alene branch have closed down work for the winter and other contractors are doing the same.

Owensboro, Falls of Rough & Green River.—The survey for the entire line was finished last week, and the work of construction will begin at once at Owensboro. The company is said to have made very satisfactory financial arrangements, and no drawbacks are anticipated from this source.

Richmond, Nicholasville, Irvine & Beattyville.—The survey for this new Kentucky road has been completed from Richmond to Irvine, and the work of grading commenced.

Rockaway Valley.—It is stated that early in the spring an extension of this line to Pottersville, N. J., will be build. The road is a small New Jersey line built this year between White River and New Germantown.

St. Louis, Arkansas & Texas.—Last week the company presented a petition to the State Supreme Court at Little Rock, Ark., asking a writ of prohibition against the Circuit Court of Jefferson County in the case of the Pine Bluff & Swan Lake company against the road, which is a suit to recover $100,000 damages for alleged breach of contract to maintain a narrow-gauge railroad from Pine Bluff to Rob Roy for the benefit of the Swan Lake Railroad. The Supreme Court denied the writ of prohibition and the case is set for trial at Pine Bluff.

Seattle, Lake Shore & Eastern.—Paul F. Mohr, Chief Engineer, has announced that the Snoqualmie Pass through the Cascade Mountains is to be abandoned by that company. The new route is to branch eastward from Snohomish city instead of the shore of Lake Washington, as formerly determined, and to cross the mountains through Cady's Pass, about thirty miles north of Snoqualmie Pass. The reason given is that Cady's Pass is much more accessible and that the only tunnel needed will be about a quarter of a mile long.

Seattle & Northern.—The road has let to H. Mitchell the contract for constructing 10 miles of grading east from Ship Harbor, on Fidalgo Island, and will shortly advertise for bids for clearing and grading about 30 miles more of the line up the Skagit River, making a total distance east from Ship Harbor of 40 miles. Three hundred men are engaged upon the first contract, and have progressed about half way across the island. These 10 miles will be ready for tracklaying by April 1, and the other 30 miles east will be completed during the spring, and the track on the whole 40 miles will be completed ready for operation by July or August. Surveyors are at present running lines near Fidalgo Island.

Sonora.—As the company has not complied with a stipulation in its concession which provided that at least 200 kilometres of road should be built every two years, and as it has not begun work on the construction of the line from Hermosillo to Ures and Paso del Norte, the President of the Republic has declared the concession for the Hermosillo, Ures & Paso del Norte Railroad forfeited.

Southern Pacific.—The extension of the Stockton & Tulare Division from Fresno, Cal., down the eastside of the San Joaquin Valley has been completed to Poso, which will be the southern terminus for some time.

Texas & Pacific.—At a recent meeting of the directors the property of the company was turned over to the new corporation by the Wistar committee of reorganization. Out of $40,000,000 of bonds, all participated in the voluntary reorganization of the company except $31,000, and only 600 shares of stock out of an issue of 320,000 shares failed to pay the assessment.

Topolobampo.—Promoters of a railroad from Topolobampo on the west coast of Mexico, 200 miles southeast of Guaymas inland, are endeavoring to form a company at Kansas City, Mo. It is claimed that the line is already graded for 35 miles, and that the Mexican government will grant a subsidy of $8,000 per mile. One hundred thousand dollars has been already subscribed by "parties in New York and Boston." The plan is to build a line to Kansas City, Mo., that portion of it in the United States to be built if $8,000 per mile is raised.

Vancouver, Klickitat & Yakima.—Seventeen carloads of rails have been received at Vancouver for the first ten miles of this road, and work is to be pushed immediately.

Versailles & Midway.—The extension of this Kentucky road from Georgetown to Midway, a distance of 10 miles, has been completed, and will soon be placed in operation.

Victoria & Fordsville.—The grading has been completed on this road from Victoria, Ky., to Fordsville, Ky., a distance of 9 miles, and tracklaying will begin at once.

Washington & Idaho.—The Attorney-General of the United States has submitted an opinion in which he holds that the Secretary of the Interior has no authority of law to permit the company to construct, under the act of May 18, 1888, a railroad through the Cœur d'Alene Indian reservation, in Idaho Territory, in advance of the ascertainments fixing the actual payment of the compensation provided for in the act. The company had asked permission to begin operations, pending action by the Interior Department fixing the amount to be paid upon the furnishing of satisfactory security by the company.

West Penn & Shenango Connecting.—The committee of the bondholders of the company will sell the property at public sale, in New York, on Jan. 5. The road runs from Coaltown Junction to Butler, Pa., 20 miles, connecting the Pittsburgh, Shenango & Lake Erie with the Pennsylvania road.

Williamsport & Binghamton.—The contract for the construction of this road, 110 miles in length, between Binghamton, N. Y., and Williamsport, Pa., which was alluded to in our last issue under the head of Binghamton & Williams-

port, has been let to Belden & McTighe, of New York city, who have lately finished the New Castle & Shenango Valley in Western Pennsylvania. They are to complete the road before Sept. 1, 1890. A part of the work has been sublet to Howe & Weed, of Great Bend, Susquehanna County, Pa. It is expected that work will begin at Loyalsock during the present month, and work finished before spring. The subcontractors will complete 12 miles before April next.

The route will be from Williamsport, Pa., up Loyalsock by way of Barbour's Mills, Hillsgrove, Forksville and Dushore, and thence by way of Towanda, Wysox Creek, Little Meadows and Appalachin to Binghamton, N. Y. The heaviest grade on the road is 42 ft., and that only for a short distance. The heaviest work on the line will be a 12-mile rock cut near Loyalsock Creek, and a bridge across the Susquehanna River, near Towanda.

When completed the road will connect with the following lines: At its southern terminus with the Philadelphia & Erie, Northern Central, Philadelphia & Reading, and Beech Creek, Pine Creek; at Dushore, Pa., it will intersect the State Line & Sullivan, and at Towanda the Lehigh Valley. At its Northern terminus it will connect with the New York, Lake Erie & Western, the Delaware, Lackawanna & Western, the Delaware & Hudson Canal Co., and the Albany & Susquehanna.

TRAFFIC AND EARNINGS.

Traffic Notes.

Scarcity of cars continues to be reported in various sections. At Columbus, O., the supply of cars for grain, which is being hurried eastward before the advance in rates which is announced for Dec. 17, is said to be less than one-tenth of the demand. A similar condition is reported at Indianapolis. On the Scioto Valley road every elevator on the line is full of wheat and corn.

Missouri Pacific officials at St. Louis report a great scarcity of cars on the lines of that company.

A dispatch from Pittsburgh announces that a number of steamboats and barges belonging to Capt. Gray, lately deceased, are to be sold in that city this week, and that prominent capitalists propose to buy them and, with additions, form a barge line to connect with the Diamond Jo line on the Mississippi River, for the purpose of transporting iron ore from St. Paul to Pittsburgh. Besides Lake Superior ores, it is proposed to run boats up the tributaries of the Ohio to get Alabama and Tennessee ores.

The Minneapolis, St. Paul & Sault Ste. Marie announces through rates freight to the East, via the Michigan Central and New York Central. The connection is made by a ferry of 8 miles, from St. Ignace across the straits of Mackinaw to Mackinaw City, Mich., the northern terminus of the Michigan Central. The rates are the same as via Chicago. It is stated that the Minneapolis, St. Paul & Sault Ste. Marie road carried east in October 145,736 barrels of flour and in November 147,041 bbls.

Messrs. J. W. Midgley, J. N. Faithorn and J. M. Johnson have been chosen arbitrators to decide certain disputed questions which have arisen between the International Railway Association and the lines leading southward from Cincinnati and Louisville, concerning rates from those cities to points in Texas.

Complaints having been made that one of the lines out of Kansas City took live stock originating at points west of the Missouri River for $27 per car Kansas City to Chicago, and in some cases as low as $25, Chairman Midgley has informed all lines that the proportion between those cities of the through rate would be $25 instead of $33.75.

Rate Cutting Through Scalpers.

Chairman Cooley's views on the selling of tickets in large quantities by the railroads to irresponsible outside agents are reported in Chicago dispatches of Tuesday as given below. The reports are evidently gleaned from outside sources, but are printed here for what they are worth.

"Judge Cooley this afternoon laid the law down vigorously to the managers and general passenger agents of the Western lines. About 200 officials assembled in the committee-room of the Central Traffic Association to hear what Judge Cooley had to say. The judge unmercifully scored those roads that have been guilty of discrimination in passenger rates by dealing secretly with scalpers. He mentioned no names, but gave his hearers to understand that he knew which were guilty; and that he had sufficient evidence in his possession to convict them of frequent violations of the law. He said the pernicious practice would have to be stopped at once, or the offenders would be prosecuted. In the course of his remarks Judge Cooley said there was nothing wrong in paying commissions to agents at small stations where the work done did not warrant the payment of a salary, but these commissions should be reasonable and not so large as to amount to a virtual infringement of the law, as had been the case where large blocks of tickets had been put into the hands of brokers. Judge Cooley talked for nearly an hour, and at the close of his speech Colonel Morrison made a few remarks of the same nature.

"Immediately after the adjournment of the meeting the General Passenger Agents convened and talked over the situation. The lines between Chicago and Omaha and Chicago and St. Paul agreed to give the necessary ten days' notice to-morrow of the restoration of passenger rates between those points. * * * Yesterday the Chicago, Milwaukee & St. Paul and the Wisconsin Central cut their rates to St. Paul from $6.50 to $6 for second class tickets. The first class rate over the Burlington also dropped from $11.50 to $8.50, and it is probable that there would have been more vigorous cutting later in the day had it not been for the investigation, and the subsequent agreement of the managers at their meeting."

In this connection, the following extract from the annual report of the Commission just issued will be of interest:

"In the blanks for the annual reports an appropriate heading called for a statement of the amount paid by each carrier as commissions, and the oath by which the report was to be verified embraced a statement that 'no deductions were made before stating the gross earnings or receipts herein set forth.' The result of this has been that in the reports for the year ending June 30, 1888, many roads show for the first time the expenditure for commissions. The returns in this respect, however, are not complete, for the reason that, the blanks not being issued until near the close of the fiscal year, the accounts had not been kept in correspondence with the requirements, and accurate information could not be readily furnished within the time allowed. In some cases the clause above stated has been erased from the oath, and no entries made in the blank calling for a statement of commissions paid.

"These matters can and will be rectified hereafter, but the returns for the present year, so far as received, do not enable the Commission to state even approximately the amount expended for this purpose. Forty-nine roads report the payment of commissions, aggregating $1,078,129, and those reported by only eight companies amount to $812,884. There can be no doubt but that the payments made on this account in past years by the various roads in the United States have amounted to many millions of dollars annually, and that payments of several hundred thousands of dollars by single roads have not been at all unusual."

Coal Shipments on the Delaware & Hudson Canal.

The total shipments of the Delaware & Hudson Canal Co. for this season have been 4,100,000 tons, an increase as compared with the same date in 1887 of 416,000 tons; 930,000 tons of this have been shipped by canal, 75,000 tons more than last year. The season just closed having been an unusually prosperous one, both for the canal company and the boatmen, as they are paid by the trip and have been able, on the average, to make from 12 to 13 round trips, there having been plenty of water through the season and no serious breaks in the banks of the canal. The number of boats employed during the season has been 650, about 100 more than last year, and it is understood that the company will build 50 new boats during the winter.

On the coast of Massachusetts increasing provision is being made for transporting coal by water, and a great many of the old wooden ships owned there are being converted into barges, in addition to the construction of a large number of 3 and 4-masted schooners for the coal trade.

Northwestern Passenger Rates.

The cutting of passenger rates from Minneapolis and St. Paul eastward and southward has become general On Saturday the rate to St. Louis was reduced from $15.85 to $13, and the second-class rate of $7 to Chicago was openly made by all roads. On Monday of this week the Chicago, St. Paul, Minneapolis & Omaha announced $7 as its first-class rate. The roads claim to have proof that the non-vestibule lines are secretly cutting first-class rates. The Burlington on that day made rates to St. Louis of $12 first-class and $10 second-class.

Trunk Line Rates.

Through freight rates from the Atlantic seaboard to the west, which were reduced on Nov. 12 by the New York Central to a basis of 50 cents first-class New York to Chicago, are to be restored to the regular basis of 75 cents on Dec. 17. The differentials by the weaker lines will be the same as before, viz.: Seventy cents by the Erie, West Shore, Lackawanna and Lehigh Valley, and 65 by the Central Vermont.

Southwestern Rates.

Eastern agents of the Missouri Pacific, and of all roads in the territory west of St. Louis, were ordered on Dec. 8 to strictly maintain all freight rates. It appears that the through rates from the Atlantic seaboard to Denver, which are on the basis of $2.63 per 100 lbs. first-class, have been disregarded for some time, and most of the freight to competitive points in Colorado has been taken at about 40 per cent. less than the tariff.

A Large Shipment of Dry Goods.

On Friday night of last week a trainload of dry goods was shipped from New York City to a firm in Tacoma, Wash. Ter., which is just establishing a wholesale dry goods house at that city. The train consisted of about 20 cars (each newspaper gives a different number), and was billed over the New York, Lake Erie & Western, Chicago & Atlantic, Chicago, St. Paul & Kansas City and Northern Pacific. The cars were covered with placards, showing the destination and indicating the unusual character of the train.

Excursion Rates.

Bids from railroads for the transportation of 130 soldiers from New York City to Council Bluffs received by the Quartermaster of the U. S. A. last week varied from $16 to $26 per head. It is stated that all the trunk lines except the Pennsylvania put in bids, and that the prices named above include the following rates offered by the roads west of Chicago: Chicago, Burlington & Quincy and Chicago, Milwaukee & St. Paul, $6; by the other two lines, $8.50.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Dec. 8, amounted to 93,391 tons, against 61,361 tons during the preceding week, an increase of 32,030 tons, and against 48,917 tons during the corresponding week of 1887, an increase of 54,474 tons. The proportions were :

	W'k to Dec. 1.		W'k to Dec. 8.	
	Tons.	P. c.	Tons.	P. c.
Wabash	7,558	12.3	7,544	8.1
Michigan Central	9,539	15.6	11,513	12.3
Lake Shore & Mich. So.	8,051	13.1	13,579	14.6
Pittsburgh, Ft. W. & Chicago	7,218	11.8	10,570	11.3
Chicago, St. L. & Pittsburgh	4,072	6.6	7,296	7.8
Baltimore & Ohio	2,730	4.4	8,063	8.6
Chicago & Grand Trunk	11,974	19.5	18,093	19.4
N. Y., Chicago & St. Louis	3,484	5.7	7,380	7.9
Chicago & Atlantic	6,735	11.0	9,353	10.0
Total	61,361	100.0	93,391	100.0

The above shipments are said to be the largest in amount known to the history of the city.

Coal.

The coal and coke tonnage of the Pennsylvania originating on lines east of Pittsburgh and Erie for the week ending Dec 1, and the year to that date, was as follows:

	Coal.	Coke.	Total.
Total for week ending Dec. 1	200,396	96,955	297,351
Total for year 1888 to date	10,702,863	3,752,407	14,455,270
Total for year 1887 to date	9,486,697	3,396,170	12,882,867

The anthracite coal tonnage of the Belvidere division of the United Railroads of New Jersey division for the same periods was as follows :

	1888.	1887.	Inc. or De.
Total for week	30,434	33,766	D. 3,332
Total for year	1,542,590	1,424,782	I. 117,708

The coal tonnages for the week ending Dec. 8 are reported as follows, in tons:

	1888.	1887.	Decrease.	P. c.
Anthracite	708,684	735,089	26,405	3.6
Bituminous	348,856	369,248	20,392	5.5

The Cumberland coal trade for the week ending Dec. 11 amounted to 67,974 tons, and for the year to that date 3,395,574 tons.

Cotton.

The cotton movement for the week ending Dec. 7 is reported as follows, in bales :

Interior markets:	1888.	1887.	Inc. or Dec.	P.c.
Receipts	178,069	159,481	I. 18,588	11.7
Shipments	143,160	145,360	D. 2,200	1.5
Stock	343,011	463,323	D. 120,312	26.0
Seaports:				
Receipts	243,080	249,019	D. 5,939	2.4
Exports	192,388	151,172	I. 41,216	27.2
Stock	816,916	965,415	D. 148,499	15.4

Railroad Earnings.

NEW YORK & NEW ENGLAND.

Quarter to Sept. 30 :	1888.	1887.	Inc. or Dec.
Gross earnings	$1,482,427	$1,369,063	I. $113,364
Oper. expenses	874,910	829,709	I. 45,201
Net earnings	$607,517	$530,354	I. $68,163
Other income	34,085	23,600	I. 10,485
Fixed charges	$406,735	$392,711	I. $14,024
Net income	$234,866	$190,243	I. $44,623
Cash on hand	279,863	105,575	I. 174,288
Deficit	541,595	512,002	I. 29,593

Earnings of railroad lines for various periods are reported as follows:

Month of October :	1888.	1887.	Inc. or Dec.	P.c.
Atch., Top. & Santa Fe	$1,560,743	$1,674,161	D. $113,418	6.8
Net	603,055	866,080	D. 263,025	30.3
Cairo, Vin. & Chic	70,153	74,545	D. 4,392	5.8
Net	27,319	28,777	D. 1,458	5.0
Carolina Central	65,204	60,113	I. 5,091	8.5
Net	42,794	35,102	I. 7,692	21.9
Central of Georgia	901,295	875,654	I. 25,641	2.9
Net	432,488	483,232	D. 50,744	10.5
Chic., Bur. & Quincy	2,802,343	2,774,923	I. 27,420	1.0
Net	1,268,283	1,222,662	I. 45,621	3.7
Chi. & East. Ill	229,374	203,971	I. 25,403	12.5
Net	108,663	.....	.....	...
Cin., N. O. & Tex. P.	329,780	328,542	I. 1,238	.4
Net	107,000	145,672	D. 38,672	26.5
N. O. & Northeast.	88,145	84,046	I. 4,099	4.8
Net	23,000	30,000	D. 7,000	23.3
Vick. & Mer	51,220	66,389	D. 15,169	22.9
Net	18,000	31,000	D. 13,000	41.9
Vick., Sh. & Pac	68,889	77,578	D. 8,689	11.2
Net	29,000	42,000	D. 13,000	31.0
Cleveland & Canton	37,695	40,100	D. 2,405	6.0
Net	14,877	15,733	D. 856	5.4
Den. & Rio Gr. W	145,249	137,175	I. 8,074	5.8
Net	66,110	56,738	I. 9,372	16.5
Flint. & Pere Mar	203,412	219,098	D. 15,686	7.2
Net	69,480	70,702	D. 1,222	1.7
Louis. & Nashville	1,437,054	1,538,706	D. 101,652	6.6
Net	558,474	628,931	D. 70,457	11.2
Louis., N. O. & Tex	240,649	264,813	D. 24,164	9.1
Net	80,335	116,013	D. 35,678	30.7
Memphis & Charles	129,810	178,549	D. 48,739	27.3
Net	3,495	68,905	D. 65,410	94.9
N. Y., O. & W	150,863	145,356	I. 5,507	3.7
Net	19,238	30,271	D. 11,033	36.4
Norfolk & Western	467,776	433,851	I. 33,925	7.7
Net	201,050	200,266	I. 784	.4
Ohio & Mississippi	384,378	413,137	D. 28,759	7.0
Net	141,785	176,664	D. 34,879	19.7
Pittsburgh & West	196,594	207,218	D. 10,624	5.1
Net	52,375	55,371	D. 2,996	5.4
Seaboard & Roanoke	82,482	77,166	I. 5,316	7.0
Net	45,701	41,445	I. 4,256	10.2
Tol. & Ohio Central	135,671	110,071	I. 25,600	23.2
Net	58,920	42,500	I. 16,420	38.6
Union Pacific	2,951,254	2,934,466	I. 16,788	.6
Net	1,296,810	1,561,020	D. 264,210	16.9
Total (gross)	$12,730,033	$12,919,628	D. $189,595	1.5
Total (net)	5,159,589	5,949,084	D. 789,495	13.3
Ten months—Jan. 1 to Oct. 31 :				
Atchison, T. & S. F.	12,799,735	15,308,334	D. 2,508,599	16.4
Net	4,011,269	7,098,453	D. 3,087,184	43.5
Cairo, Vin. & Chi	603,490	632,429	D. 28,933	4.6
Net	191,954	210,091	D. 18,137	8.6
Carolina Central	427,452	411,227	I. 16,225	3.9
Net	150,320	131,767	I. 18,553	14.1
Central of Georgia	5,796,376	5,257,615	I. 538,761	10.2
Net	1,953,701	1,763,635	I. 190,066	10.8
Chi., Bur. & Quincy	19,390,635	23,065,856	D. 3,675,201	15.9
Net	4,585,357	10,278,837	D. 5,693,480	55.4
Cin., N. O. & Tex. P.	3,004,404	2,755,339	I. 249,065	9.0
Net	903,000	1,030,538	D. 127,538	12.4
N.O. & Northeast'n	683,265	545,295	I. 137,970	25.3
Net	78,000	76,000	I. 2,000	2.6
Vicks. & Meridian	366,081	430,643	D. 64,562	15.0
Net	40,000	55,000	D. 15,000	27.3
Vick., Shreve. & P.	426,003	447,340	D. 21,337	4.8
Net	83,000	98,000	D. 15,000	15.3
Cleveland & Canton	321,609	310,927	I. 10,682	34.3
Net	103,632	89,993	I. 13,639	15.1
Denv. & Rio Gr. W.	1,099,896	961,398	I. 138,498	14.4
Net	292,523	283,277	I. 9,246	3.3
Flint. & Pere Marq.	2,004,161	2,147,286	D. 143,125	6.7
Net	623,541	690,698	D. 67,157	9.7
Louisv. & Nashville	13,247,190	13,090,716	I. 156,474	1.2
Net	4,640,751	5,123,870	D. 483,119	9.4
Louis., N. O. & Tex.	1,822,640	1,616,600	I. 206,040	12.7
Net	419,508	450,914	D. 31,406	7.0
Mem. & Charles	1,247,844	1,359,174	D. 111,330	8.2
Net	187,289	305,680	D. 118,391	38.7
N. Y., Ont. & West	1,437,846	1,298,811	I. 139,035	10.7
Net	219,703	239,379	D. 19,676	8.2
Norfolk & Western	4,062,175	3,438,154	I. 624,021	18.2
Net	1,599,604	1,410,562	I. 189,042	13.4
Ohio & Mississippi	3,176,274	3,445,118	D. 268,844	7.8
Net	921,421	1,241,264	D. 319,843	25.8
Pitts. & Western	1,666,151	1,687,498	D. 21,347	1.3
Net	408,446	.....	.....	...
Seaboard & Roanoke	544,557	509,207	I. 44,350	8.8
Net	193,928	181,605	I. 12,323	6.8
Tol. & Ohio Central	993,182	863,720	I. 129,462	15.0
Net	301,861	279,757	I. 22,104	6.2
Union Pacific	24,244,109	23,716,309	I. 527,851	2.2
Net	9,418,804	10,005,271	D. 586,467	5.9
Total (gross)	$99,365,152	$103,290,086	D. $3,924,934	4.0
Total (net)	30,919,166	41,044,591	D. 10,125,425	32.7

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Emigrant Rates.

It was announced on Dec. 12 that the Delaware, Lackawanna & Western had announced an advance of emigrant fares to the regular fare ($13, New York to Chicago) from the $5 rate which has prevailed for several months, and on the following day that the other roads had given a similar notice.

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the current volume of the *Railroad Gazette:*